

INDEX OF SUBJECTS.

A B S T R A C T S. 1882.

A.

Aannerödite, a new mineral, 579.
Aberdeenshire experiments on the relative value of soluble and insoluble phosphates, 653.
Abriachanite, occurrence and localities of, 288.
Absorption-spectra of cobalt salts, 131.
Absorption-spectrum of nitrogen tetroxide (pernitric anhydride), 1017.
— of ozone, 1017.
Acetal, monochlor-, action of chloride of lime on, 29.
Acetamide, 822.
— action of bromine in alkaline solution on, 950.
— bromochlor-, 944.
— chlorodibrom-, 944.
— trichlor-, action of chlorine on, 1281.
Acetanilide, decomposition of, by water, 1088.
— existence of a limit in the formation of, and the relation between the limit and the temperature, 1087.
— formation and decomposition of, 1084.
— influence of mass on the velocity of formation of, and on the limit of that reaction, 1088.
— velocity of formation of, and the influence of temperature on its formation, 1085.
Acetates, metallic, decomposition of some, in presence of water, 388.
Acetates of chromium, iron, and aluminium, reactions of, 825.
Aceteugenol, nitro-, 1201.
Acethydroxamic acid, 936.
Acetic acid, combinations of, with ammonia, 1162.
— bromodichlor-, and its salts, 943.
— chlorodibrom- and its salts, 944.
— — thermal and volumetric researches on, 3.
— — trichlor-, action of potassium cyanide on, 711.

Acetic acid, trichlor-, and its lead salts, 295.
— — and phenols, condensation-products of, 1288.
Acetic acids, chlor-, etherification of, 818.
Acetic series, nitrils of the higher members of, 1273.
Acetoacetic acid, 1052.
— — occurrence of, in urine, 1120.
Acetochloramide, trichlor-, 1281.
Acetodibromamide, 951.
Acetoguaia col, 55.
Acetomalic anhydride, 831.
Acetometmethoxy salicylaldehyde, 53.
Acetometmethoxy salicylic acid, 53.
Acetometethoxy salicylaldehyde, 53.
Acetomonobromamide, 951.
Acetomonochloramide, 951.
Acetonaphthalide, α - and β , 972.
 β -Acetonaphthalide, nitro-, 204.
Acetone, action of hydroxylamine on, 1047.
— condensation of, 941.
— dichlor-, 1039.
— nitroso-, 941, 1047, 1052.
— cyanhydrin, 56.
— derivatives, nitrogenous, 1184.
— solutions of halogenated compounds, action of caustic alkalis on, 491.
Acetonebromoform, 492.
Acetonechloroform, 492.
Acetophenone, amido-acids from, 57.
— paramido-, 847.
— paranitro-, 847.
Acetoxime, 1047.
Acetoximic acid, 1185.
— — formula of, 1047.
Acetoxanthraquinone, 859.
Acetylani side, and its nitro-compounds, 302.
Acetylanthramine, 860.
Acetylanthranol, 856.
Acetylbenzoylaniline, 176.
Acetylbutylphenol, 176.
Acetylcarbazole, brom-, 1104.
Acetylchrysarobin, 858.

- Acetyl diphenylamine, action of phosphorus pentachloride on, 178.
 Acetylene, explosion of, 453.
 —— heat of combustion of, 721.
 —— spectrum of, 129.
 Acetyl furoin, 499.
 Acetyl methyl carbamide, 822, 951.
 Acetyl phenylthiocarbazine, 1095.
 Acetyl piperidine, 983.
 Acetyl piperpropylalkeïne, 1193.
 Acetyl tetrahydrocinchominic acid, and its salts, 530.
 Achrooglycogen (a new carbohydrate) from the mucin of *Helix pomatia*, 708.
 Acid amides, formation of bases from, 958.
 —— chambers, estimation of nitric oxide in the exit gases of, 774.
 —— chlorides, formation of, by aid of sulphuric hydroxychloride, 1185.
 Acids (bibasic) of the paraffin series, action of electrolytic hydrogen on, 1185.
 —— obtained from xylene and phthalic anhydride, 848.
 —— of double function, etherification of, 485.
 —— of the paraffin series, mono- and di-basic, combination of, with phenols, 1201.
 —— (polybasic) of the paraffin series, obtained from malonic acid by Conrad's method, synopsis of, 1187.
 —— of the paraffin series, tri- and penta-basic, 1191.
 Aconitates, 717.
 Aconite, extract of, 635.
 Aconitic acid in the scale from sorghum-sugar pans, 766.
 Acorns as distillery material, 121.
 Acroleïn, action of phosphorus pentachloride on, 376.
 —— preparation of, 375.
 Acroleïn-carbamide, 1195.
 Acryldiureide, 1195.
 Acrylic acid, derivatives of, 38.
 —— brom-, 190.
 —— chlorobrom-, action of hydrogen bromide on, 1047.
 —— chlorobromiod-, and its salts, 1049.
 —— dibrom-, 162, 1186.
 —— dibromiod-, and its salts, 1048.
 —— tribrom-, 162, 1049.
 Acrylic acids, brom-, constitution of, 493.
 Actinium, further notes on, 697.
 Adipic acids, 1305.
 Adipocere, 760.
 Adonidine, 1126.
Adonis vernalis, active principle of, 1126.
 Aesculin, is gelsemic acid identical with? 1109.
Aethalium septicum, paraholesterol from, 303.
 Affinity value of the silicofluorides of the metals, as deduced from the law of smallest volumes, 1024.
 Agronomic estimation of soils, 991.
 Air, band-spectrum of, 677.
 —— accurate and rapid method for analysis of, 335.
 —— action of, in rendering the flame of the Bunsen lamp more luminous, 129.
 —— amount of ammonia absorbed by hydrochloric acid from, 798.
 —— amount of carbonic anhydride in, at Calèves, near Nyon, Switzerland, altitude 420 m., 1026.
 —— hot, disinfection by the aid of, 1143.
 —— numerical results of the mean ratio of oxygen to the sum of oxygen and nitrogen in, 1025.
 —— some conclusions as to the cause of the frequent fluctuations in the ratio of oxygen to nitrogen in, at different times, 1026.
 Air-thermometer for temperatures above 360°, 135.
 —— new form of, 354.
 Albite from Monte Cau in the Pyrenees, 285.
 β -Albumin, 75.
 Albumin, behaviour of ferric chloride to, 1141.
 —— compounds of copper with, 747.
 —— crystallised, from hemp and castor-oil seeds, composition of, 876.
 —— crystallised, from pumpkin seeds, 877.
 —— metaphosphoric acid as a test for, 110.
 Albuminoïd substances, digested, substances analogous to ptomaines in, 1115.
 —— —— in blood serum, rotatory power of, and their estimation by this means, 110.
 Albuminoids, constitution of, 75.
 —— digestibility and quantitative estimation of, 1239.
 —— in koumiss, peptonisation of, 1221.
 —— in oil-seeds, 234.
 —— in plants, quantitative estimation of, 901.
 —— of blood serum, 75.
 —— of the *vesicula seminalis* in guinea-pigs, 543.

- Albuminoïds, pancreatic, 1119.
 — report on a memoir on, by A. Béchamp, 984.
 Albuminous solutions, filtration of, through animal membranes, 538.
 Alcohol, commercial purification of, 1013.
 — diatomic, derived from β -naphthol, 735.
 — electrolysis of, 406.
 — new, from dialdane, 489.
 — qualitative and quantitative estimation of fusel oil in, 339.
 — ferment, researches on the physiology and morphology of, 80.
 Alcohol-acids, formation of ethereal salts of, 486.
 Alcohols, action of chloride of lime on, 28.
 — of double function, etherification of, 485.
 — polyatomic, production of colouring matters by the action of aromatic nitro-substitution-products on, 784.
 — rectification of, 487.
 — secondary, general method of preparing, 376.
 — tertiary, diagnosis of, 1040.
 Aldehyde, silver solution as a reagent for, 1329.
 — reaction, 107.
 — monochlor-, and hydrate and polymeride of, 1045.
 Aldehyde-ketone of the aromatic series, 730.
 Aldehydes, chlorinated, action of zinc-ethyl and zinc-methyl on, 295, 377.
 — new combinations of, with phosphonium iodide, 710.
 Aldehydosulphites of amido-acids and amines, 304.
 Aldol, preparation of, 488.
 Algarobilla, use of, in tanning, 908.
 Alizarin, application of, in dyeing and calico printing, 1251.
 — preparation of, 125.
 — mononitro-, preparation of, 863.
 Alizarin-orange, preparation of, 863.
 Alkali-green, 503.
 Alkalimetry, indicators for, 774.
 — use of potassium dichromate in, 1233.
 Alkaline chromates, action of hydrazic acids on, 280.
 — — — geometrical relations which exist between many, 147.
 — iodides, action of lead iodide on, 142.
 — — — action of lead peroxide on, in presence of carbonic acid, 143.
 Alkaline sulphates, geometrical relations which exist between, 147.
 — sulphides, action of sulphur on, in dilute solutions, 141.
 Alkalies, separation of magnesium from, 97.
 — and alkaline-earths, solubility of mixtures of salts of, 1264.
 Alkaloid, cinchona, a new, 229.
 — from tyrosine, 730.
 — new, from *Cinchona cuprea*, 316, 317.
 — of *Aconitum paniculatum*, 635.
 Alkaloids, 876.
 — cinchona, 1113.
 — discovery of, from proteid animal matter, 873.
 — estimation of, by potassiomercuric iodide, 664.
 — estimation of, in cinchona barks, 899.
 — extraction of, by means of oxalic acid, 1003.
 — from the bark of *Quebracho colorado*, 744.
 — identification of, 340.
 — in barks, method for estimating, 665.
 — in cinchona bark, estimation of, 246.
 — in cinchona bark, Prollius' method for the estimation of, 1139.
 — lupine, 229.
 — of the papaveraceæ, 1112.
 — potassiobismuthous iodide as a test for, 900.
 — spectra of, 349.
 — vegetable, separation of ptomaines from, 1006.
 — — — supposed reagent for distinguishing ptomaines from, 430.
 Alkines, 165, 1193.
 Alkyl-anthracenes, 862.
 Alkyl-anthradihydrides, 861.
 Alkyl chlorides and iodides, addition-products of the bases obtained from quinoline and, 1112.
 — disulphoxides, so-called, synthesis of, 831.
 Alkyl-hydranthranols, 862.
 Alkyloxanthrols and their derivatives, 860.
 Alkyloxanthryl chlorides, 862.
 Alkyl-substituted amido-acids, 303.
 Allantoin in young leaves, 1195.
 Allenic tetrachloride, 1039.
 Allyl alcohol, β -chlor-, 376.
 Allyl chloride, β -chlor-, and some of its derivatives, 375.
 — — — chlor-, action of hypochlorous acid on, 1039.
 — iodide, action of mercuric ethide and phenylide on, 409.

- Allyl tetrachloride, β -chlor-, 376.
 Allylactic acid, and its silver salt, 35.
 Allylene-digallein, and its diacetates, 1289.
 Allylidene chloride, 376.
 — tetrachloride, 376.
 Allylmalonic acid, action of bromine on, 947.
 Allylthiohydantoins, synthesis of, 408.
 Allyltriethylammonium bromide, influence of heat on, 709.
 Allotropic copper, so-called, formation and composition of, 428.
 Alloys, easily fusible, apparatus for the determination of the melting points of, 914.
 — formation of, by pressure, 921.
 Alnein, 309.
 Aloes, reactions of, 1239.
 Alpinin, 209, 866.
Alsine media, examination of, 989.
 Alum, estimation of, in wine, 96.
 — growth of crystals of, in presence of another salt, 574.
 Alumina, fixation of, as a discharge on indigo-blue by means of aluminium chloride, 676.
 Aluminium, action of, on cupric chloride, 1266.
 — gallate, solubility of, in water, 849.
 — iodide, preparation of, 364.
 — revision of the atomic weight of, 279.
 — sulphates, 698.
 — and iron, quantitative separation of, 426.
 — iron, and chromium, reactions of the acetates of, 825.
 Alums, expansion of, 1020.
 — molecular volumes of, 1259.
 Amalic acid, 629.
 — — — decomposition of, by boiling with water, 632.
 — — — of theobromine, 633.
 — — — revision of the formula of, 632.
 — — — synthesis of, 632.
 Amarine, constitution of, 1064.
 Ambrosiusbrunn - Quelle, Marienbad, Bohemia, examination of, 25.
 American grasses, composition of, 762.
 Amethyst, cause of the purple colour of, 1269.
 Amides, action of bromine in alkaline solutions on, 822, 950, 1052.
 — action of chlorine on, 1281.
 — aromatic, direct conversion of, into their corresponding azo-compounds, 47.
 — amides, estimation of, in vegetable extracts, 1006.
 — formation of the primary amines by the action of caustic alkalis on the products obtained by the action of bromine on, 1053.
 — of monobasic acids of the paraffin series, preparation of, 950.
 Amidines, a new class of, 1061.
 Amido-acids, alkyl-substituted, 303.
 Amines, action of, on dichloronaphthaquinone, 973.
 — — — on the quinones, 735, 967.
 — aromatic, dry distillation of the mucates of, 178.
 — — — laws of substitution of, 954, 1058.
 — preparation of, from phenols and alcohols, 179.
 — primary, formation of, by the action of caustic alkalis on the products obtained by the action of bromine on amides, 1053.
 — secondary and tertiary, of secondary alcohol-radicles, attempts to prepare, 820.
 Ammonia, amount of, absorbed by hydrochloric acid from the air, 798.
 — atmospheric, fixation of, by plants, 242.
 — burning of, in oxygen, a lecture experiment, 138, 690.
 — carnallite as a fixer of, 1130.
 — estimation of, by distillation, 1230.
 — new compounds of, with nitric and acetic acid, 1162.
 — occurrence of, in plants, 885.
 — presence of, in human saliva, 78.
 — separation of, from gas, 1331.
 Ammonia-fixing power of certain salts, 651.
 Ammonium bisulphide, tension of, 1021.
 — caprylate, amide from, 950.
 — carbamate, tension of the vapour of, 269.
 — carbonate, dissociation of, 162.
 — cyanide, tension of, 1021.
 — molybdate solution, preparation and use of, 554.
 — nitrate, action of gaseous ammonia on, 800.
 — salts, action of, on animals, 760.
 — sulphhydrate, dissociation of, 269.
 — tribromide, 139.
 — and potassium tri- and tetra-chromates, 146.
 Amphibole-andesite, 1034.
 Amyl alcohol (fermentation), specific heat and latent heat of evaporation, 355.
 Amylamine, 1054.
 Amylanthracene, and its derivatives, 862.

- Amyl-anthradihydride, 862.
 Amylbenzene, 46.
 — amido-, 1284.
 — — hydrochloride, action of sodium nitrite on, 1284.
 Amylcaproylcarbamide, 1053.
 Amylcinchonidine, and its platinochloride, 228.
 Amylglyoxaline, 821.
 Amyl-hydranthranol, 862.
 Amylisocaproylcarbamide, 1053.
 Amylnaphthalene, synthetical, 1210.
 Amylnitrous acid, and some of its salts, 710.
 Amylodextrin, sodium-compound of, 491.
 Amyloxanthranol, 861.
 Amyloxanthanyl chloride, 862.
 Amylphenol, 727.
 — synthesis of, 171.
 Amylpiperidine and its derivatives, 982.
 Amylum, quantitative estimation of, 558.
 Analcime, 285.
 — artificial production of, 479.
 — from Etna, 284.
 Anatase from Rauris in Salzburg, 574.
 Anda-assu, oil of, 435.
 Angelica, essence of, 410, 1300.
Angelica archangelica, methylethyl-acetic and hydroxymyristic acids in the essential oil of the fruit of, 496.
 Anhydro-bases from dibasic acids, 180.
 Anhydrobenzodiamidobenzene triiodide, 505.
 Anhydrobenzodiamidotoluene, dimethyl- and diethyl-derivatives of, 505.
 Anhydro-compounds, 180, 503.
 — — — of phenols, 505.
 Anhydriodiamidoparatolyxylene, 504.
 Anhydrolupinine, 873.
 Anhydrosalicyldiamidobenzene, 504.
 Anhydrotolylidiamidobenzene, 504.
 Anhydrotolylidiamidotoluene, 504.
 Anhydrovaleryldiamidotoluene, 180.
 Anhydroxaltoluidide, 181.
 Anhydroxanilide, 181.
 Anilic acid, nitro-, potassium salt of, 714.
 Anilidomalonylanilide, 39.
 Aniline, action of hydrogen dioxide on, 502.
 — and its homologues, action of epichlorhydrin on, 1067.
 — butylation of, 176.
 — synthesis of homologues of, from bromaniline, 722.
 — dibromonitro-, 355.
 — dichlor-, symmetrical, action of halogens on, 1058.
 — ortho- and meta-nitro-, action of halogens on, 954.
 Aniline, paranitro-, action of carbon bisulphide on, 955.
 — tribrom-, action of nitric acid on, 954.
 Aniline-black, 1150.
 — — — resists for, 126.
 Anilines, nitro-, action of phenylthiocarbimide on, 183.
 — three chlor-, action of halogens on, 954.
 Animal body, aromatic substances in, 514.
 — — — oxidation of aromatic substances in, 756.
 — — — reduction processes in, 952.
 — — — synthetic processes in, 756.
 Animal charcoal, absorption of sugar by, 122.
 — — — action of, on syrup, 673.
 — — — substitute for, 1016.
 — — — waste, conversion of, 1245.
 Animal fats, estimation of free acids in, 429.
 — fluids, " acidity " of, 1221.
 — forms, electrical researches on, 638.
 — organism, distribution of arsenic in, after administration of arsenious anhydride, 416.
 Animals, action of urea and ammonium salts on, 760.
 — elimination of gaseous nitrogen by, 636, 747.
 — formation of fat in, 238, 878.
 Anisaldehyde, amido-acids from, 57.
 Anisamide, brom-, 192.
 Anisic acid, brom-, a new, 169.
 — — — decomposition of the calcium salt of, by dry distillation, 616.
 — — — etherification of, 487.
 — — — monobrom- and di-brom-derivatives of, 191.
 Anisoil, paranitro-, 396, 953.
 — red, preparation of, 125.
 Anisylcarbamides, mono- and di-, 302.
 Anisylthiocarbamides, mono- and di-, 302.
 Annuals, ripening of, 419.
 Anthracene, action of hydrogen dioxide on, 502.
 — dihydride, 855, 858.
 — hexahydride, 857.
 Anthracenemonosulphonic acid, salts of, 859.
 Anthracylamine, and its hydrochloride, 974.
 Anthramine, and its acetyl-derivative, 858, 860.
 — and its hydride, 1105.
 Anthranol, and its acetyl-derivatives, 856.

- Anthraquinol, and its preparation and derivatives, 860.
 Anthraquinone, alkylised reduction-products of, 860.
 — and its derivatives, reduction of, 855.
 — acetylamoido-, 860.
 — amido-, 523, 860.
 — amidodibrom-, 523.
 — nitramidodibrom-, 524.
 — series, reduction in, 855.
 Anthraquinones, nitro-brom-, 522.
 Anthraquinonesulphonic acid, reduction of, 858.
 — acids, nitro-, action of reducing agents and sulphuric acid on, 1106.
 — — — nitro- and amido-, and their salts, 1105.
 Anthrol, 857, 858, 859.
 — ethylic ether, and its nitro-compound, 1212.
 — methylc ether, and its nitro-compound, 1212.
 Antimony, additional experiments on the atomic weight of, 367.
 — explosive, 467.
 — volumetric estimation of, in presence of tin, 661.
 — chloride, electrolysis of solutions of, 467.
 — iodide, boiling points of, 354.
 — and tin, estimation and separation of, 1324.
 Antiseptics, 1243.
 Apoatropine and its salts, 740.
 Apocaffeine, 631.
 Apocinchene, 224.
 Apophyllic acid, 313.
 — — — brom-, action of hydrochloric acid on, 314.
 — — — brom-, and its salts, 314.
 Apophylline, dibrom-, and its derivatives, 315, 1109.
 — hydrobromide, dibrom-, 315.
 Apotheobromine, 633.
 Apparatus for determination of the melting points of easily fusible metals and alloys, 914.
 — for fractional distillation, 551.
 — for the accurate analysis of gases, some points in the construction of, 1131.
 Arabinose, 591, 819.
 Arable soils, phosphoric acid in, 767.
 Areometric method, new, by Soxhlet, for the estimation of fat in milk, 778.
 Archil, detection of, in wines, 1006.
 Argento-antimonious tartrate (silver emetic), 389.
 Argentoquinine, 219.
 Argentous oxide, 997.
 Aricine, fresh occurrence of, 317.
 Aromatic acids, action of iodine on silver salts of some, 970.
 — bases, condensation-products of, 833.
 — compounds, action of hydrogen dioxide on, 501.
 — ethereal salts of phosphoric acid, preparation of, 839.
 — group, action of sodium ethylate on some brominated compounds of, 168.
 — hydroxy- and amido-acids, 515.
 — substances in the animal body, 514.
 — substances in the animal body, oxidation of, 756.
 Arsenates neutral to litmus, 1267.
 Arsenic, distribution of, in the animal organism after the administration of arsenious anhydride, 416.
 — estimation of, 99.
 — estimation of, in copper, 1135.
 — Fresenius-Babo's test for, 555.
 — iodides of, 367.
 — theory of the physiological action of, 242, 987, 1223.
 — trihydride, explosion of, 454.
 Arsenic acid, action of, on the sodium salts of tungstic acid, 702.
 Arsenical bismuth subnitrate, 573.
 — copper, purification of, 432.
 Arsenious chloride, absorption of chlorine by, 19.
 Arsonium compounds, constitution of, 305.
 Asbestos containing sodium, 475.
 — fabrics, 116.
 Ash ejected from Vesuvius, February 25th, 1882, 932.
 — of cereals, analysis of, 1313.
 — of the various parts of *aster amellus*, analysis of, 887.
 Ashes of plants, estimation of phosphoric acid in, 553.
 Ashes and lavas ejected in the latest eruptions of Vesuvius (1868—1882), chemical composition of, 1177.
 Asparagine in young leaves, 1195.
 — relation of, to animal nutrition, 986.
 Aspidosamine, 743.
Aspidosperma Quebracho, alkaloids of, 742.
 Aspidospermatine, 742.
 Assimilation theoretically considered, 1312.
Aster amellus, analysis of the ash of the various parts of, 887.
 Atmography, 1008.

- Atmosphere, carbonic anhydride in, 692.
 — estimation of carbonic anhydride in, 1137.
 — the constituent of, which absorbs radiant heat, 566.
 — variations of the amount of oxygen in, 278.
- Atomic arrangement, influence of, on the physical properties of compounds, 458.
 — combination, relation of molecular volume to, 1024.
 — weights of elementary bodies, relation between, 358.
 — — — remarks on, 922.
- Atranoric acid, 867, 1084.
 — — — and its derivatives, 1083.
- Atraric acid, 1084.
- Atrolactic acid, synthesis of, from acetophenone, 520.
- Atrolactyltropeine, 984.
- Atropic acid, 741.
- Atropine, new colour reactions of, 340.
 — researches on, 740.
- Augite-andesite, 1035.
- Aurin, bromination of, 1290.
 — oxidised, nature of the so-called, 1292.
 — brom-, hydrobromide of, 1290.
 — sulphate, 1292.
- Azoanthracene, tetrabromotetrimido-, 523.
- Azoanthrol colours, 976.
- Azobenzene, 502.
 — crystalline form of, 965.
 — dichlor-, 953.
 — formation of, from bromaniline, 722.
- Azobenzenedisulphonic acid, α - and β -, and its salts, 48, 516, 834, 1197.
- Azobenzenemonosulphonic acid, substitution-products of, 836.
- Azobenzenenitrosulphonic acid and its salts, 836.
- Azobenzeneparasulphonic acid, nitro-derivatives of, and their salts, 1285.
- Azobenzene - resorcinolazonaphthalene, 611.
- Azobenzene thymolsulphonic acid and its salts, 834.
- Azo-colouring matters, 609.
 — — — — new, preparation of, 443.
- Azo-compounds, complicated, nomenclature of, 1061.
- Azocumic acid, 971.
- Azonaphthalene - resorcinolazobenzene, 611.
- Azo-opianic acid and its barium salt, 402.
- Azo-orthophenoxyacetic acid, 849.
- Azophenyldiparasulphonic acid and its salts, 194.
- Azophenyldiparasulphonyl chloride, 195.
- Azophenylene, 516.
- Azophenylglyoxylic acid, 621.
- Azophthalic acid and its salts, 515.
 — — — preparation of, 125.
- Azotin, 769.
- Azotoluene, 502.
- Azotolueneresorcinol, 610.
- Azotolueneresorcinolazobenzene, 610.
- Azoxyanisyl- β -naphthol, 49.
- Azoxyanisyl- β -naphthol- α -disulphonic acid, 50.
- Azoxyanisyl- β -naphtholsulphonic acid, 49.
- Azoxybenzene, conversion of, into oxy-azobenzene, 394.
 — dichlor-, 953.
 — preparation of, 965, 1061.
- Azoxylene- α -thymolsulphonic acid, 834.
- Azoxyleneresorcinol, 611.

B.

Bacillus butylicus, 1121.

Bacteria, composition of cell membranes of, 80.

— multiplication of, in the blood of living animals by a chemical ferment free from organisms, 1309.

Balsam of Peru, adulteration of, 1339.

Baloraidite, 289.

Bamboo, potash from, 781.

Band-spectrum of air, 677.

Barberry, examination of the root of, 1140.

Barium, basic halogen salts of, 141.

— separation of, from strontium and calcium in the form of chromate, 997.

— aluminate, 141.

— cyanide and its hydrates, 484.

— formate, action of heat on, 1050.

— nitrate, hydrated, 13.

— sulphate, influence of the temperature of the voltaic arc on, 362.

— — — precipitation of, 97.

— — — solubility of, in concentrated sulphuric acid, 465.

Bark of *Fraxinus americana*, 1150.

Barks, method for estimating the total alkaloids in, 665.

Barley, chevalier, 549.

— continuous cropping with, 329.

— continuous growth of, at Woburn in 1881, 1226.

- Barley for malting and feeding purposes, some of the conditions influencing the quality of, 888.
 —— malting, preservation of, 1014.
 —— manuring experiments on, 1130.
 —— sprouting, 418.
 —— steeped, composition of, 645, 761, 1224.
 Barren sandy heath, manuring experiments on, 654.
 Bassaltic lava, crystallised paraffin in geodes in, 810.
 Basalts of Sicily, 152.
 Base, new, analogous to neurine, 1303.
 —— —— from a piperidine-derivative, 982.
 Bases, aromatic, condensation products of, 833.
 —— formation of, from acid amides, 958.
 —— found in putrefaction products, 1307.
 —— obtained from quinoline and the alkyl chlorides and iodides, addition-products of, 1112.
 Battery, secondary, 135.
 Bay tree, California, occurrence of a new fat acid in the nut of, 1186.
 Beans, cultivation of various kinds of, with special regard to the amount of nutrients produced, 83.
 —— kidney, loss of water from, when ripening, 243.
 Becker's method of creaming, 674.
 Beech-tar, creosote from, 1328.
 Beegerite, a new mineral, 575.
 Beer, action of light on, 122.
 —— Bertel's method of growing, 244.
 —— estimation of glycerol in, 557.
 —— examination of, for foreign bitter principles, 103.
 —— reducing power of, 1137.
 —— sulphuric acid in, 556.
 Beet, analysis of, 898.
 —— composition of soil deposited by the water employed for washing, 1315.
 —— culture in Vaucluse, 244.
 —— distribution of heat and rain during the growth of, 990.
 —— experiments on, with potassium sodium nitrate, 771.
 —— French, cultivation of some kinds of, 243.
 —— increase of root and leaf of, during growth, 640.
 —— influence of superphosphates on the percentage of sugar in, 1314.
 —— investigation of, 782.
 —— manuring experiments on, in Brunswick, 767.
 —— manuring of, 89, 93, 654, 1314.
- Beet, potash salts as manures for, 1130.
 —— value of different varieties of, 424.
 Beet-juice, purification of, by lime, 672.
 —— —— purification of, by means of sulphurous acid and filtration through gravel, 1337.
 Beet-molasses waste, product of the distillation of, 1256.
 Beet seeds, relation between the moisture of the soil and the germination of, 641.
 Beet-spirit, purification of, 1335.
 Beet-wine, 1336.
 Belladonna, absorption-spectra of solutions of, 349.
 —— roots, importance of starch in, 1126.
 Benzaldehyde, action of acetone on, in presence of alkaline solutions, 513.
 —— cyanhydrin, 56.
 —— orthonitro-, 840.
 —— —— action of dimethylaniline on, 834.
 —— paranitro-, 393.
 —— —— action of aniline sulphate, orthotoliduidine, and orthoanisidine, 833.
 Benzaldehydeamidoacetic sulphite, 304.
 Benzaldehydeamidobenzoic sulphite, 304.
 Benzaldehyde-green, paranitro-, 394.
 Benzene, action of amyrene on, in presence of aluminium chloride, 46.
 —— action of amyrene hydrochloride on, in presence of aluminium chloride, 46.
 —— action of dichlorethyl oxide on, in presence of aluminium chloride, 1209.
 —— congelation of solutions of neutral compounds in, 1260.
 —— constitution of, 721, 952, 1196.
 —— α -dinitrochloro-, derivatives of, 1057.
 —— direct production of phenol from, 395.
 —— heat of combustion of, 721.
 —— hexbromo-, 47.
 —— metadiamido-, derivatives of, 391.
 —— methylation of, by methyl and aluminium chlorides, 390.
 —— monobromo-, action of aluminium chloride on, 606.
 —— mono-, di-, and tri-bromo-, action of sulphuric acid on, 46.
 —— nitrosomethylamido-, 189.
 —— nitrosomethylmetanitro-, 1070.
 —— nitrosomethylorthonitro-, and methylated, 188.
 —— orthodinitrochloro-, action of sodium sulphite on, 953.

- Benzene, paradibromo-, action of sodium ethylate on, 168.
 —— paranitrochloro-, action of alcoholic potash on, 953.
 —— tetrabromo-, 47, 606.
 Benzenesulphonamide, nitrochloro-, 954.
 Benzenesulphonic acid, action of hydrogen peroxide on, 502.
 —— —— mono- and di-bromo-, 47.
 —— —— nitrochloro-, sodium salt of, 953.
 —— —— paramido-, 1075.
 Benzenyldiphenylamidine, 957.
 Benzenyldiphenylamine, dichloro-, 178.
 Benzenyldiphenyldiamine, 957.
 Benzhydroxylpropionic acid, 618.
 Benzdine, substituted derivatives of, 199.
 Benzidine-tetracarboxylic acid, 516.
 Benzobenzoylaniline, 176.
 Benzodimethylaniline methiodide, 176.
 Benzfuril, 500.
 —— tetrabromide, 500.
 Benzofurilic acid, 500.
 Benzofuroin, 500.
 Benzoic acid, action of different kinds of, and their sodium salts, on potassium permanganate, 339.
 —— —— action of iodine on the silver salt of, 970.
 —— —— officinal, and its behaviour towards potassium permanganate, 1138.
 —— —&c., action of potassium permanganate on, 1328.
 —— —— production of, from toluene, 1146.
 —— —— dibromo-, from orthopara-dinitrobenzoic acid, 183.
 —— —— nitro-, etherification of, 818.
 Benzoic acids, amido-, hydrofluorides of, 613, 614.
 Benzoic bromide, 514.
 Benzenophenone, homologues of, 1292.
 Benzophenyl carbamate, 508.
 Benzophenylisonitrile, 508.
 Benzopyrocatechol, 508.
 Benzoresorcinol, 508.
 Benztotrichloride, action of copper on, 1103.
 —— compounds of, with aromatic bases, 956.
 Benzoyl compounds, researches on, 507.
 Benzoylacrylic acid, 1074.
 Benzoylaniline and its derivatives, 176, 508.
 Benzoylaniside, 302.
 Benzoylbenzoic acid, 508.
 Benzoylbutylphenol, 176.
- Benzoylconylethylalkeïne, 1193.
 Benzoylcrotonic acid, 1074.
 Benzoyldibromodiphenylamine, 1060.
 Benzoyldimethylaniline, 176.
 Benzoyldiphenylamine, action of phosphorus pentachloride on, 178, 1060.
 Benzoylhydroxymyristic acid and its salts, 497.
 Benzoyl- α -metaisocymenol, 300.
 Benzoylmononitrodiphenylamine, 1059.
 Benzoylmononitroparaditolylamine, 1060.
 Benzoylorthamidoparaditolylamine, action of tin and acetic acid on, 1061.
 Benzoylorthodinitrodiphenylamine, 1060.
 Benzoylphenol, 177, 508.
 Benzoylphenylcarbamine, 176.
 Benzoylphenylmethane, 177.
 Benzoylphenylthiocarbamide, 177, 508.
 Benzoylphenylthiocarbazine, 1095.
 Benzoylpiperethylalkeïne, 1193.
 Benzoylpropionic acid, 1074.
 Benzoylylenesulphonamide, α - and β -, 1208, 1209.
 Benzyl alcohol, dinitro-, 1198.
 —— —— orthonitro-, 840.
 —— —— parabromo-, 170.
 —— —— preparation of, 170.
 —— bisulphide, 1058.
 —— bromide, orthiodo-, and its derivatives, 1057.
 —— compounds, parabromo-, 170.
 —— cyanide, action of bromine on, 169.
 —— —— paramido-, and its derivatives, 1070.
 —— nitrate, paranitro-, 1198.
 Benzylamines, parabromo-, 170.
 Benzylammonium benzylcarbamate, 56.
 Benzylchloromalonamide, 1208.
 Benzylcureumin, parabromo-, 1108.
 Benzylidiphenylamine, 502.
 Benzylfluorene, 202.
 Benzylidene bromobenzoate, 514.
 —— furfurylidene ketone, 513.
 —— phenyl ketone and its bromine-compound, 512.
 Benzylidene-acetone and its bromine-compound, 511.
 Benzylmalonic acid, nitroso-, and some of its salts, 39.
 Benzylmetacresylic oxide, 1204.
 Benzyloxyphenylacetic acid, 403.
 Benzyloxyphenyl- α -propionic acid and its salts, 1072.
 Benzylparamethoxyphenyl- α -propionic acid and its salts, 1072.
 Benzylphenanthrene, 202.
 Benzylphenol, 171, 727.
 Benzyl-piperidine, 982.

- Berberis Aquifolium, v. Alpens*, "Oregon grape root," examination of the root of, 1140.
 Berberonic acid and its salts, 230.
 Bergenin, 159.
 Bergenitol and its derivatives, 159.
 Bergmann's theory, remarks on, 793.
 Berthollet's theory, remarks on, 793.
 Beryl, occurrence of, near Freistadt in Upper Austria, 580.
 Bhreckite, 288.
 Bicarbonates, alkaline, estimation of, 895.
 Bile, bullock's, Hüfner's reaction with, 1218.
 — contributions to the chemistry of, 874.
 — formation of, 878.
 — gases of, 754.
 Bile-pigments, reactions of, 232.
 Birds, excretion of uric acid by, 416.
 Bismuth iodide, compounds of, with organic bases, 528.
 — subnitrate, arsenical, 573.
 — — preparation of, 18.
 Bitter almond oil, production of, from toluene, 1146.
 Biuret cyanurate, 167.
 Black chalk, preparation of, 248.
 — spinell in the greenstones of Elba, 480.
 Blacking, 444.
 Blast-furnace slag, phosphorescent, 345.
 Bleaching, 128.
 — application of sulphurous anhydride in, 1337.
 Blende, crystallography of a variety of, 369.
 Blood, detection of nitrous acid in, 1231.
 — of animals living in elevated regions, richness in oxygen of, 1120.
 — peptone in, 78.
 — quantitative estimation of urea in, 667.
 Blood-corpuscles, white, relation of, to the coagulation of the blood, 322.
 Blood-letting, variations in the composition of the serum after, 751.
 Blood-serum, albuminoïds of, 75.
 — — and other animal fluids, "acidity of," 1221.
 — — rotatory power of the albuminoïd substances in, and their estimation by this means, 110.
 Blood-stains, detection of, 561.
 — — diagnosis of, by measurement of the blood-corpuscles, 342.
 Blowing wells near Northallerton, 372.
 Bone-meals of various degrees of fineness, manuring experiments with, 653.
 — — — extraction of fat from, by light petroleum, 123.
 — — — steamed, and dissolved, oats manured with, 333.
 Boracite, 148.
 Boric acid, detection of, by means of the microscope, 245.
 — — — existence of, in notable quantities in the Dead Sea, 1037.
 Borneol, carbonic ether of, 528.
 — cyanate, 625, 1213.
 — — — etherification of, 817.
 — acetate, oxidation of, 66.
 Borneolcarboxylic acid, 66.
 Bostonite, 116.
 Bothrops, potassium permanganate as an antidote to the poison of, 879.
 Bottle-stones of Moravia and Bohemia, and of Trebitsch, 581.
 Box-trees, use of, in agriculture, 93.
 Brackebuschite, a new vanadate, analysis of, 150.
 Brain-derivatives, new, remarks on the paper on, by Eugen Parcus, 538.
 — human, amount of cholesterin in, 78.
 — some new constituents of, 235.
 Brains, putrefaction-products of, 77.
 Brandy, estimation of fusel oil in, 1235, 1327.
Brassica Napus seed, distribution of myronic acid in, 243.
 — *Rapa* seed, distribution of myronic acid in, 243.
 Bread, Croatian, analysis of, 1151.
 Brewing, gelatinised grain for, 1337.
 — in Japan, 432.
 Bromal, chloro-, 938.
 — — — alcoholate, 938.
 — — — hydrate, 938.
 Bromanil, 714.
 Bromine, electric conductivity of, 679.
 — indirect estimation of, by electrolysis, 772.
 — use of, in the analysis of nickel and cobalt, 99.
 — vapour-density of, 794.
 Bromoform, chloro-, 938.
 Bronze of the ancients, 805.
 — monuments, exposed, preservation of, 669.
 Bronzes, formation of patina on, 1334.
 — tungsten, 930.
 Brucine, pyridine bases derived from, 1302.
Bryonia, composition of, 884.
 Buckwheat, composition of, 642.
 Bullock's bile, Hüfner's reaction with, 1218.
 Bunsen burner, luminosity of the flame of, induced by heating the tube, 256.
 — — — action of air in render-

- ing the flame of, more luminous, 129.
 Bunsen burner, non-luminosity of the flame of, 129.
 Bustamite from Laangban, analysis of, 291.
 Butaldehyde-ammonia, normal, 709.
 Butane, dinitro-, 825.
 Butter, 348.
 — adulteration of, 559.
 — detection of foreign fats in, 1003.
 — estimation of salicylic acid in, 1003.
 — examination of, 110.
 — formation of, and its physical and chemical composition, 674.
 — from sweet and sour cream, 348.
 — and milk, 899.
 Butyl acetate, trichloro-, 824, 1279.
 — alcohol, trichloro-, 824, 952, 1279.
 — bromide, tertiary, 154.
 — chloride, trichloro-, 1279.
 Butylanisoil, 176.
 Butylbenzene, amido-, and some of its derivatives, 176.
 Butylchloral, action of zinc ethide on, 824.
 — action of zinc-ethyl on, 1279.
 Butylphenol, action of phosphoric anhydride on, 176.
 — synthesis of, 171.
 Butylnitrous acid, and some of its salts, 710.
 Butyl-oxanthranyl chloride, 862.
 Butyric acid, nitroso-, 944.
 — bromide, α -bromo-, action of zinc-methyl on, 37.
 Butyric acids, α - β -dibromo-, 598.
 Butyrolactone, 497.
 Buxine, 745.
 Buxine, 745.
Buxus sempervirens, active principles of, 744.
 Byssolite, 582.
- C.**
- Cabbages, fodder, 423.
 Cadaveric alkaloids, formation of, 741.
 Cadmium, estimation of, 98.
 — methods for the detection of, in presence of copper, 1232.
 — revision of the atomic weight of, 363.
 — separation of, from zinc, 97.
 — sulphide, crystallisation of, 363.
 — and nickel sulphates. Part III of researches on chemical equivalence, 689.
- Cæsium and its salts, preparation of, 464.
 Caffeïne, 217, 232, 628, 629.
 — action of bromine on, 629.
 — and its derivatives, 217.
 — conversion of xanthine into, 981.
 Caffeol, 232.
 Caffoline, 217.
 — constitution of, 628.
 Caffuric acid and its salts, 217, 631.
 Calcite, artificial production of, 1270.
 Calcium aluminates, solubility of, in water, 903.
 — carbonate, artificial pseudomorphosis of, after gypsum, 282.
 — basic, 695.
 — — — separation of, in the wood of dicotyledonous plants, 82.
 — chloride, crystalline compounds of, with alcohols, 27.
 — cyanide, 484.
 — formate, action of heat on, 1050.
 — hypophosphite, preparation of, 695.
 — oxychloride, heat of formation of, 452, 682.
 — phosphate, analysis of, 141.
 — separation of magnesium from, 97.
 — sulphate, influence of the temperature of the voltaic arc on, 362.
 — sulphide, decomposition of, by calcium chloride, 562.
 — — — violet phosphorescence of, 677.
 Calorimetric studies, 451.
 Calorimetical measurements, comparison of the results of, 265.
 Camphéride and its derivatives, 208, 209.
 Camphocarboxylic acid and its derivatives, 66.
 Campholurethane, and derivatives of, 1213.
 Camphor, bromo-derivatives of, 864, 1300.
 — bromo-, phenol obtained by the action of zinc chloride on, 739.
 — combination of, with aldehyde, 526.
 — dibromo-, isomerism of, 1300.
 — — — two isomeric and crystalline forms of, 864, 865.
 — dichloro-, 738, 864.
 — — — an isomeric, 1107.
 — mono- and di-bromo-, properties of the bromine-atoms in, 526.
 — monobromo-, 864.
 — tribromo-, 1301.
 Camphor-derivatives containing nitrogen, 527.
 Camphoric acid, etherification of, 384.

- Canadian fibre, 116.
 Cane-sugar, dissolved in methyl alcohol and in acetone, specific rotation of, 30.
 — influence of invertin on the fermentation of, 1277.
 — oxidation of, 1041.
 — sodium-compound of, 491.
 "Canna edulis sterilis" as food, 990.
 Caoutchouc, vulcanised, preservation of, 1152.
 Caproic acid, heat of combustion of, 567.
 — isobromo-, action of water on, 944.
 — lactones from, 34.
 — monobromo-, acid obtained in the preparation of caprolactone from, 946.
 — — normal, lactone of, 33.
 — — present in rosin oil, 711.
 Caprolactone, 946.
 Capronitril, amido-, and amidoiso-, 191.
 Carbanides, polysubstituted, 182, 183.
 Carbanilide, dibromo-, 609.
 Carbazole, some derivatives of, 1103.
 Carbazole-carboxylic acid and its derivatives, 1103.
 Carbazolic acid and its derivatives, 1103.
 Carbohydrate, a new, 159, 427, 708, 939.
 — (achroo-glycogen) from the mucin of *Helix pomatia*, 708.
 — from *Fucus amylaceus*, 939, 1044.
 — from the chemically combined carbon in cast iron, 427.
 Carbohydrates, compounds of, with alkalis, 490.
 Carbolic acid, difference in the action of solution of, in oil and in water, 1143.
 Carbon, atomic weight of, 794.
 — bisulphide, action of bromine on, 706, 945.
 — qualitative test for, in coal-gas, 107.
 — chemically combined, estimation of, in cast iron, wrought iron, and steel, 427, 1134.
 — colorimetric estimation of, in iron, 98.
 — compounds of, with hydrogen and nitrogen, spectra of, 252.
 — diffusion of, 358.
 — estimation of, in iron and steel, 337, 1134.
 — new compound of, with sulphur and bromine, 706.
 — possibility of artificially preparing amorphous elementary, free from hydrogen, oxygen, and nitrogen, 26.
 — refraction-equivalents of, in organic compounds, 133.
- Carbon chlorides, transformation of, into bromides, 375.
 — compounds, liquid, dependence of the molecular refraction of, on their chemical constitution, 910.
 — — — — molecular refraction of, 909.
 — — — — relation between the optical and thermal properties of, 263, 445.
 — — — spectra of, 130, 252.
 — oxychloride, production of, from chloroform, 935.
 — oxysulphide, conversion of, into carbamide and thiocarbamide, 823.
 — spectrum, 251.
 — tetrachloride, conversion of, into bromide, 375.
 Carbonic acid, hydrated, composition of, 692, 1026.
 — — — of muscle, 539.
 — — — derivatives, suggestions respecting the nomenclature of, 381.
 Carbonic anhydride, amount of, in the atmosphere at Calèves, near Nyon, Switzerland, altitude 420 m., 1026.
 — — — in the atmosphere, 361, 692, 1026, 1137.
 — — — law of solubility of, in water at high pressures, 1021.
 — — — liquid, in smoky quartz, 474.
 — — — proportion of, in the upper regions of the atmosphere, 361.
 — — — qualitative test for, in coal-gas, 107.
 — — — relation between the decomposition and formation of, 548.
 — — — spectrum of, 253.
 — — — and water vapour, temperatures of combustion and dissociation of, 453.
 Carbonic oxide and oxygen, temperature of combustion of a mixture of, 453.
 Carbons, pure, for the electric light, 1142.
 Carbonylamidobenzoic acid, and some of its salts, 609.
 β -Carbopyrolic acid, 213.
 Carbopyrolic acid, mononitro-, and its salts, 876.
 — — — α -trichloro-, and its salts, 875.
 Carbosilicon, 571.
 — compounds, new, 933.
 Carbostyryl, 732.
 — and its derivatives, 201, 1209.
 — monochloro-, 733.
 Carbostyrylic acid, 732.
 Carbotriphenylamine, preparation of, 180.
 Carbotriethiohexabromide, 706.
 Carboxycornicularic acid, lactone of, and its constitution, 1076.

- Carnallite as a manure and fixer of ammonia, 1130.
 Caroba balsam, 764.
 Carobic acid, 764.
 Carobin, 764.
 Caroborin, 764.
 Carvacrol from essence of Savory, 737.
 — occurrence of, in origanum oil and in oil of *Thymus Serpyllum*, 1065.
 — occurrence of, in the ethereal oil of garden sage (*Satureia hortensis*), 1065.
 Cascarinine, 1004.
 Casks, effect of adding soda or acid to the water used for seasoning, 1337.
 Cast iron, action of mercuric chloride on, 660.
 — — — carbohydrate from the chemically combined carbon in, and the estimation of that carbon in, 427.
 — — — direct deposition of copper on, 670.
 — — — malleable, 116, 1143.
 Castor-oil seed, composition of crystallised albumin from, 876.
 Catalytic reaction, a new, 1262.
 Catechin, action of diazobenzene chloride on, 67.
 Catechins, 67.
 Catechol series, nitro-products of, 1200.
 Caulosterin, 1202.
 Celluloid matter, action of strong alkalis on, 380.
 — — — digestion of, 237, 985, 1119.
 Cellulose, certain properties of, 420.
 — — nitration of, 1184.
 — — and coal, 31.
 Cement, action of, on lead pipes, 1335.
 — — Portland, 1143.
 Cereals, analysis of the ashes of, 1313.
 — — quantity of water necessary for, 1312.
 Cerebrin, 235.
 Cerebrose, 537.
 Cerebrosic acid, 537.
 Ceresin, &c., specific gravity of, 1139.
 Champagne, clarification of must in the manufacture of, 1145.
 Charcoal, action of, on a solution of gold chloride, 809.
 Cheese, 348.
 — new American process for making, 124.
 — poor, of Cantal, 441.
 — ripening of, 436.
 Cheese-making, general theory of, 439.
Chelidonium majus, presence of citric and malic acids in, 82.
 Chemical action, influence of mass on, 1261.
 — affinity, determination of, 6, 360, 449.
 Chemical constitution and molecular refraction, relation between, 351.
 — equivalence, 689.
 — processes, studies in, 5.
 — reactions, velocities of, 456.
 — symmetry, or the influence of atomic arrangement on the physical properties of compounds, 458.
 — work done by the galvanic cell, 1257.
 Cherry-water, examination of, 348.
 Chica, 1311.
 Chicken cholera, 324.
Chinolinum tartaricum, analysis of, 868.
 Chiolite, composition of, 1176.
 Chitenidine, 1307.
 Chloral, action of zinc-ethyl and zinc-methyl on, 295.
 — action of zinc methide on, 491.
 — bromo-, 938.
 — — — alcoholate, 938.
 — — — hydrate, 938.
 Chloralid, bromo-, 938.
 Chloranil and dimethylaniline, colouring matter from, 58.
 Chlorate, estimation of, in hypochlorites, 94.
 Chlorates, formation of, from chlorides by the action of the electric current, 925.
 — preparation of, 431.
 Cholestraphan, 217.
 Chloric acid, quantitative estimation of, 894.
 Chloride of lime, detection of, in water, 1316.
 Chlorides, formation of hypochlorites and chlorates from, by the action of the electric current, 925.
 — in urine, new method for the quantitative estimation of, 551, 552.
 Chlorine, absorption of, by arsenious chloride, 19.
 — dioxide, vapour-density of, 1161.
 — dissociation of, 794.
 — estimation of, in presence of iodine and bromine, 1230.
 — — — in wines, 919.
 — — — with the aid of Gooch's method of filtration, 894.
 — — — by electrolysis, 772.
 — — — preparation of, 278.
 — trioxide, so-called, 460.
 Chlorites, 460.
Chlormalonylamide, 39.
 Chloroform, action of potassium sulphide on, 589.
 — bromo-, 938.
 — new method of testing for, in cases of poisoning, 777.
 — production of carbon oxychloride from, 935.

- Chlorophyll, 67, 412.
 Chlorophyllanic acid, 412.
 Chocolate, examination of, 1139.
 Cholesterin, 1202.
 — amount of, in human brain and in hens' eggs, 78.
 Cholestophane, 629.
 — dimethylglyoxyl carbamide, a reduction-product of, 1054.
 Chromammonium compounds, 468, 1167.
 Chromates, action of ammonia on, 1029.
 — alkaline, action of hydracids on, 280.
 Chrome-iron ore of Japan, 21.
 Chromium bromide, hydrated, 280.
 — estimation of, 1234.
 — oxybromide, 280.
 — phosphate, use of, in analysis and in the arts, 998.
 — and mercury, salts of, 293.
 — iron, and aluminium, reactions of the acetates of, 825.
 Chromophosphate of lead and copper, 283.
 Chrysarobin, oxidation of, 858.
 Chrysoidinesulphonic acid and some of its salts, 392.
 Cinchene, 224.
 Cincholepidine and some of its salts, 533.
 Cincholine, 1114.
 Cinchomeronic acid, behaviour of, on heating, 311.
 Cinchona alkaloid, a new, 229.
 — alkaloids, 229, 1113.
 — bark, estimation of the alkaloids in, 246, 899.
 — — Prollius's method for the estimation of alkaloids in, 1139.
 Cinchona cuprea, new alkaloid from, 316, 317.
 Cinchonamine and its salts, 229.
 — cinchona bark, 634.
 Cinchonic acid and some of its salts, 1304.
 Cinchonidine, 228.
 — haloïd and hydrocarbon derivatives of, 227.
 — oxidation of, 220.
 — separation of, from quinine, 74.
 — and urea, double salt of, 74.
 Cinchonine, action of alkalis on, 309.
 — constitution of, 224.
 — distillation of, with potash, 414.
 β -Cinchoninesulphonic acid and its derivatives, 225.
 Cinchotine, occurrence and behaviour of, 982.
 Cinnamene, paranitrochloro-, 847.
 Cinnamic acid derivatives, 191.
 — Cinnamic acid, monochloro-, 1073.
 — — para- and ortho-nitro-, 845.
 — — para- and ortho-nitro-, and derivatives of, 840.
 — — paranitro-, derivatives of, 846.
 — — paranitro-, nitration of, 401.
 — — paranitrobromo-, 842, 843.
 — — monobromo-, isomeric, behaviour of, with concentrated sulphuric acid, 615.
 Cinnamon leaves, oil of, 1300.
 Cinnamone, preparation of, 511.
 Cinnamylformic acid, new method for the preparation of, 520.
 Cinnamyltriethylalkeïne, 1193.
 Circuit, closed, external work in, 1156.
 Citraconamide, 1281.
 Citraconanil, 1281.
 Citraconanilide, 1281.
 Citraconic acid, 829.
 — — and its isomerides, etherification of, 383.
 — — derivatives of, 1281.
 — — anhydride, 829.
 — — chloride, 1281.
 Citrates, ammoniacal, 604.
 Citric acid, abnormal crystals of, 498.
 — — action of chlorine gas on, 498.
 — — estimation of, in wine, 1000.
 — — presence of, in *Chelidonium majus*, 82.
 Cladonic acid, 1080.
 Clay, zinc-bearing, from Pulaski Co., Virginia, 24.
 Clayslate needles, small, 483.
 Clover, perishing of, in winter, 548.
 Clover hay, comparative experiments on the digestion of two kinds of, by the horse and sheep, 237.
 Coal, composition of, 931.
 — condition of sulphur in, and its relation to coking, 780.
 — and cellulose, 31.
 Coal-gas, estimation of sulphur in, 1326.
 — — qualitative test for carbon bisulphide and carbonic anhydride, 107.
 Cobalt, detection of, 555.
 — salts, absorption-spectra of, 131.
 — and nickel, separation of, 1234.
 — — use of bromine in the analysis of, 99.
 — nickel, and copper, colour relations of, 1.
 Cocaine, preparation of, 75.
 Cockchafer, constituents of the ashes of, 1223.
 Cock's-foot grass (*Dactylis glomerata*), cultivation of, in Saxony, 422.

- Cod-liver oil, presence of phosphorus and iodine in, 673.
 Codeine, 311, 1112.
 —— action of phosphorus oxychloride on, in presence of phosphorus pentachloride, 312.
 —— action of phosphorus pentachloride on, 311.
 —— bromo-, and the action of phosphorus pentachloride on, 312.
 —— chloro-, action of phosphorus pentachloride on, 313.
 —— nitro-, action of phosphorus pentachloride on, 313.
 —— methiodide, 218.
 —— methoxide, 218.
 —— new colour reactions of, 340.
 —— transformation of morphine into, 981.
 Codethylene methiodide, 218.
 Coerulein, 58, 61.
 —— dye-stuff from, 126.
 Coerulin, 60, 61.
 Coffee, products obtained by the roasting of, 230.
 Colchicine, 75.
 Colchicine, preparation and derivatives of, 74.
 Colchicoresin, and the β -compound, 75.
 Cold and liquefaction produced by the mutual action of solids, 450.
 Collodion emulsions, analysis of, 111.
 Collodion-gelatin emulsions, analysis of, 112.
 Colloids, nitrogenised, synthesis of, 415.
 Colophony, products of the distillation of, 737, 1179, 1301.
 Colour of the Mediterranean and other waters, 1017.
 —— photography, by tinting layers of coagulated albumin, 668.
 —— relations of nickel, cobalt, and copper, 1.
 Colouring matters from dimethylaniline and chloranil, 58.
 —— —— from gallacetophenone, 1288.
 —— —— in flour-paste, 739.
 —— —— from Chinese yellow-berries, capers, and rue, 976.
 —— —— new, 124, 441, 675, 784, 1066, 1067, 1288.
 —— —— preparation of, by the action of diazocansoils on naphthols and naphtholsulphonic acids, 124.
 —— —— production of, by the action of aromatic nitro-substitution-products on phenols and polyatomic alcohols, 784.
 Columbic acid, 1005.
 Columbine, 1004.
 Columbite, from Amelia Co., Virginia, 1175.
 Combustible substances, difficulty, analysis of, 998.
 Comenamic acid, 197.
 Comenamide, 197.
 Comenic acid and its derivatives, 197.
 —— —— derivatives of, 601.
 Composts, composition of materials adapted for, 1229.
 Compound, crystalline, formed in water containing hydrogen sulphide and mercaptan, 592.
 Compounds, influence of atomic arrangement on the physical properties of, 458.
 Conlydrine, 215.
 Coniferin, 1124.
 Conine and its compounds, 215.
 Conversion colours, 564.
 Conylethylalkaine, 166.
 Copaliba balsam, "Maracaibo," constituents of, 65.
 Copalic acid, commercial so-called, constituents of, 65.
 Copiapite, optical properties of, 281.
 Copper, arsenical, purification of, 432.
 —— allotropic, so-called, formation and composition of, 428.
 —— albuminate, 747.
 —— direct deposition of, on cast iron, wrought iron, and steel, 670.
 —— electrolytic estimation of, 428, 660.
 —— estimation of arsenic in, 1135.
 —— extraction of, 346.
 —— for elementary analysis, preparation of, 1235.
 —— metallic, absorption of oxygen by, 551.
 —— —— estimation of impurities in, 1232.
 —— lead vanadate from laurium, 472.
 —— molten, of various degrees of dryness, action of salt on, 669.
 —— new process for extracting, from copper pyrites, 904.
 —— nickel and cobalt, colour relations of, 1.
 —— salts, action of ammonia on some, 1266.
 —— separation of, from the precious metals, 119.
 —— solution, alkaline, action of glucconic, saccharic, lactic, and mucic acids on, 429.
 —— sulphate, anhydrous, solubility of, in methyl alcohol, 1274.
 —— —— basic, 1266.
 —— sulphide, crystallised, formed from ancient coins in hot springs, 142.
 —— volumetric estimation of, 776.
 Copper-plating, 782.
 Copying ink for transcribing letters without a press, 128.

- Corallin, constituents of, 1290.
 Corallin-phthalein, 1291.
Coriandrum sativum, essential oil of the fruit of, 525.
 Corn ergot, analysis of, 785.
 —— smut, analysis of, 785.
 Cornicularic acid, and lactone and constitution of, 1077.
 Cossyrite, a new mineral from Liparite lavas of the island of Pantellaria, 152.
 Cotarnine, 313, 869.
 Cotton-seed meal, fodder experiments on milch cows with, 321.
 —— —— oil, 436.
 —— —— —— test for distinguishing, from olive-oil, 662.
 Couple with manganese, forming salts which can be utilised or regenerated, 134.
 Cows, milch, fodder experiments on, with cotton-seed meal and peanut-meal, 321.
 —— —— feeding, with cotton cake, 636.
 —— —— feeding, with grass and lucerne, 238.
 —— —— use of Soja beans as food for, 83.
 Cream, sweet and sour, butter from, 348.
 Creamer, Reimer's, experiments with an improved form of, 124.
 Creaming by the aid of heat, 124.
 —— use of Laurence's cooler in, 1149.
 —— process, comparison of the Holstein and Swarts', 1148.
 Creosol, 210.
 —— derivatives of, 54.
 Creosote from beech-tar, 1328.
 Cresaurin, 1201.
 Cresol, dibromonitro-, 969.
 —— mononitro-, 728.
 Cresorcinol, 729, 969.
 Cresyl ethyl oxides, nitrated and amido-, 1202, 1203.
 Critical point, 136.
 Croatian bread, analysis of, 1151.
 Crops, influence of the distance between the seed sown, on the growth and quality of, 646.
 Crotonic acid, molecular refraction of, 827.
 Crotonic acids, monohalogen-substituted, decomposition of, by alkalis, 945.
 —— —— two isomeric, 712.
 —— chlorides, chloro-, two isomeric, 712.
 Crotyl acetate, monochloro-, 1280.
 —— alcohol, monochloro-, 1279.
 Cryolite, composition of, 1176.
 Crystal of one substance in the solution of a different compound, development of, 1269.
 Crystallogenic observations, 574.
 Crystals produced by the action of metals sealed up in carbon bisulphide, 12.
 Cucurbitaceæ of Uruguay, 884.
 Cumaldehyde, synthesis of thymol from, 727.
 Cumic acid, constitution of, 971.
 —— —— synthetical, oxidation of, 840.
 Cuminamidacetic acid, 515.
 Cuminglycollic acid, 515.
 Cupreine, 142.
 Cupric chloride, action of aluminium on, 1266.
 —— oxide, action of ammonia on, 1266.
 —— —— reduction of, by grape-sugar in neutral solutions, 558.
 —— —— use of, for the separation of alumina and the higher oxides from protoxides, 897.
 —— salts, tests for, 556.
 Cuprine, 313, 314.
 Cupronine, 870, 872.
 Cuproso-cupric sulphites, 280, 1028.
 Cuprous isosulphite, 1166.
 —— oxide, detection of, in presence of cupric and other metallic oxides, 1232.
 —— sulphites and their derivatives, 1165.
 —— and silver iodides and their alloys, coefficients of contraction and expansion of, 570.
 Curcas cake, 85.
 Cureumin and derivatives and oxidation of, 1107, 1109.
 Current from a Gramme machine, effects produced in a vacuum by, 913.
 Currier's "mucilage," 1339.
 Cusconine, fresh occurrence of, 317.
 Cutose, certain properties of, 420.
 Cyanhydrins of aldehydes and ketones, action of aniline on, 50.
 —— of benzaldehyde, acetone, and diethylketone, amido-acids from, 55, 56.
 Cyanic acid, normal, N : C.OH, and its derivatives, 590.
 —— ether of borneol, 625.
 Cyamidamic acid, 1056.
 Cyanides, decomposition of, 102.
 —— of metals of the iron-group, 154.
 Cyanogen, explosion of, 453.
 —— bromide, action of sodium ethylate on, 590.
 —— spectrum, inversion of, 1.
 Cyanphenine, formula of, 1064.
 Cyanoquinolines, 869.

Cyanotypes, 113.
 Cyclopite from Etna, 284.
 Cymene, action of bromine and chlorine on, 301.
 —— preparation of, 608.
 —— dinitrobromo-, 619.
 —— nitro-, action of sulphuric chlorhydrin on, 722.
 —— nitrobromo-, 619.
 —— para, sulphonic acids of, 196.
 Cymenedisulphonic acid, nitro-, and some of its salts, 722.
 Cymene- β -sulphonic acid and its salts, 196.
 Cymidine and its salts, 728.
 Cymylene chloride, nitro-, 727.
 Cymylphosphinic acid, 964.
 Cymylphosphodichloride, 964.
 Cyprusite, a new mineral, 578.
 Cystine, 1282.
 —— and rotatory power of, 1206.
 —— bromo-, 1282.
 —— constitution of, 758.
 Cytoblast, chemical nature of, 422.

D.

Dactylis glomerata (Cock's-foot grass), cultivation of, in Saxony, 422.
 Dairy, experimental, at Kiel, report of, for 1880—1881, 1149.
 —— station of Fan (Cantal), researches executed in 1880 at, 436.
 Danburite, crystallised, from Russel and Danbury, 150, 151.
 Dari, composition of, 1224.
 Datolite, 582.
 —— from Theiss in Tyrol, 574.
 Daturine, action of nitric acid on, 635.
 —— and its salts, 634.
 Dead Sea, existence of lithium and boric acid in notable quantities in, 1037.
 Decarbusnein, 1080.
 Decarbusnic acid and its acetyl-derivatives, 1080.
 Decine, a new hydrocarbon, 738, 1301.
 Dehydrocamphor, 528.
 Dehydromucamide, 498.
 Dehydromucic acid and its derivatives, 498.
 —— chloride, 498.
 Deoxyanthraflavic acid, 975.
 Deoxybenzoin, homologues of, 1292.
 Dephinine, absorption spectra of solutions of, 349.
 Dephosphorising pig-iron, preparation of basic furnace-limings for, 1012.
 Descloizite, analysis of, 150.

Detonation and the production of an explosive wave, 1261.
 Developer, ferro-oxalate-citrate, 1009.
 Developers for silver chloride pictures, preparation of, 2.
 Devitrification, 343.
 Dextrin, action of diastatic ferments on, 749.
 —— action of nitric and sulphuric acids on, 160.
 —— alkali-compounds of, 491.
 —— quantitative estimation of, 558.
 Dextrose, preparation of, from starch, 1146.
 Dextro-tartaric acid, derivatives of, 830.
 Diabase rocks of the Buchan District, 584.
 Diabetes, influence of muscular work on the elimination of sugar and urea in, 755.
 Diacetamide, 822.
 Diacetylhydrazinebenzoic acid, 1069.
 Diacethydroxamic acid, 375.
 Diacetocamphride, 209.
 Diacetoxynaphthalene, 205.
 Dialdane, new alcohol from, 489.
 Dialkyl-compounds, 505.
 Diallyl ethyl carbinol, 488.
 Diallylacetic acid, action of hydrobromic acid and bromine on, 946.
 Dialyser, gelatin jelly as, 663.
 Diamond, artificial formation of, 281.
 —— origin and formation of, in nature, 1269.
 Dianisylcarbamide, 302.
 Diapositives, Wilde's chloride of silver gelatin plates for, 1142.
 Diastase, rennet, and digestive, 437, 438.
 Diastatic ferments, action of, on starch, dextrin, and maltose, 749.
 Diaterpenylic acid and its salts, 43.
 Diazamido-derivatives, action of phosgene on, 507, 608.
 Diazobenzanilide, action of phosgene on, 507.
 Diazobenzene, action of sulphuretted hydrogen on, 1285.
 —— chloride, nitro-methylnitro-, 1070.
 Diazobenzenemetamidobenzoic acid, action of phosgene on, 608.
 Diazobenzeneparabromanilide, action of phosgene on, 609.
 Diazobenzeneparatoluide, action of phosgene on, 507.
 Diazocamphor, 527.
 Diazo-compounds, 48.
 γ -Diazoisophthalic acid, 1297.
 Diazophenetoil nitrate, dibromo- and tribromo-, 396.
 Diazophenol sulphate, 397.

- Diazophenols, 396.
 Dibenzhydroxamic acid, Lossen's, 375.
 Dibenzocampherede, 209.
 Dibenzoquinol, 508.
 Dibenzoresorcinol, 508.
 Dibenzoyldiamidotoluene and its derivatives, 392.
 Dibenzoyldiphenyl, 62.
 α -Dibenzoyldithymol, 624.
 D.benzoyleuxanthone, 1301.
 Dibenzoylmethadiaminobenzene and its derivatives, 391.
 Dibenzoyloxy naphthalene, 205.
 Dibenzylcarbonide, 200.
 Dibenzylcarboxylic acid, diamido-, 170.
 Dibenzylcarboxylic acids, two isomeric, 200.
 Dibenzyl diphenyl, 62.
 Dibenzylene dicyanide, 170.
 Dibenzylidene acetone, 513.
 — preparation of, 511.
 Dibenzyl-thymol and its acetyl-derivative, 172.
 — methylic and benzoic ethers of, 173.
 Diethylbenzene, synthesis of, 952.
 Didymium, remarks on, 1165.
 Dielectrical polarisation, existence of, in electrolytes, 789.
 Diethoxynaphthalene, 1212.
 Diethyl nitro pyrogallate, 54.
 — quinonehydrodicarboxylate, 714.
 — succinosuccinate, preparation of, 712.
 Diethylacetic acid, amido-, 56.
 Diethylamidosulphuryl chloride, 1283.
 Diethylmethylsulphamide, 1283.
 Diethyleuxanthone, 1301.
 Diethylguanidine hydrochloride, 191.
 — platinochloride, 191.
 Diethylketene, 166.
 Diethylmalonic acid, 39.
 Diethylpropylalkine, 165.
 — action of methyl iodide on, 1194.
 Diethylpropylglycoline, 1195.
 Diethylsulphone, action of chlorine on, 939.
 Difficultly combustible substances, analysis of, 998.
 Diffusion of solids, 357, 454.
 — of some organic and inorganic compounds, 1159.
 Difurfurylideneacetone, 513.
 Digestion, gastric, 753, 877.
 Digestive diastase, 438.
 — fluids, 1119.
 Digitaline, absorption spectra of solutions of, 349.
 Diglycollic acids, substituted imido-formation of, in the preparation of paratolyl- and phenyl-glycine, 518.
- Dihydranthranol, 857.
 Dihydroanthracenemonosulphonic acid, salts of, 858.
 Dihydrocornicularic acid, constitution of, 1077.
 Dihydroethylecarbostyryl, 733.
 Dihydroxyanthraquinonesulphonic acid, 1106.
 α -Dihydroxybenzoic acid, derivatives of, 193.
 — — mono- and dibromo-, and their salts, 193, 194.
 Dihydroxybenzophenone, 1291.
 Dihydroxynaphthalene, 205.
 Dihydroxypropylmalonic acid, barium salt of, 947.
 Dihydroxysuberic acid? 716.
 Dihydroxytoluene, 729.
 Dihydroxyvaleric acid, barium salt of, 35.
 Disatogen, 620.
 Diisobutylketenedisulphonic acid, sodium salt of, 943.
 Diisobutyramide, 950.
 Dilactones, 946.
 Di-p-lutidine platinochloride, 310.
 Dimalonamide, imido-, 947.
 Dimesitylcarbamide, 956.
 Dimesitylguanidine, 956.
 Dimesitylthiocarbamide, 956.
 Dimethoxynaphthalene, 205.
 Dimethyl cyanurate, 822.
 Dimethyl ethyl carbinol, specific heat and latent heat of evaporation, 355.
 Dimethyl isopropyl carbinol, 37, 491.
 Dimethyl pseudobutyl carbinol, 37.
 Dimethylalloxan, hydrated and anhydrous, 630, 631.
 Dimethylalloxantin, 633, 1055.
 Dimethylamine hydrochloride, action of sulphuric monochloride on, 164.
 — sulphochloride, 164.
 Dimethylallynhydrobenzodiamidobenzene tri-iodide, 505.
 Dimethylaniline, action of hydrogen dioxide on, 502.
 — amidophenol, trichloro-, 401.
 — dinitro-, 1057.
 — from quinoline, 739.
 — paramido-, action of carbonic chloride on, 182.
 — reactions of, 175.
 — and chloranil, colouring matter from, 58.
 Dimethylanilinesulphonic acid, nitro-, and amido-, 176.
 Dimethylanisidine, 302.
 Dimethylbenzophenone, 1293.
 Dimethylcatechol, 54.
 Dimethyldeoxybenzo'in, 1292.
 Dimethylidialuric acid, 632.
 Dimethylidioethylsulphamide, 1282.

- Dimethyldihydroxybenzophenone, 1099.
 Dimethyl ethylalkine, 166.
 Dimethylexanthone, 1301.
 Dimethylfumaric anhydride, 1114.
 Dimethylgentisic acid, 53.
 — aldehyde, 53.
 Dimethylglyoxylcarbamide, a reduction-product of cholestrophane, 1054.
 Dimethylguanidine hydrochlorides, 191.
 — platinochlorides, 191.
 Dimethylmalonamic acid, potassium salt of, 942.
 Dimethylnaphthalene, 733.
 — and bromo-derivatives of, 854.
 Dimethylnaphthalenesulphonic acid, 855.
 Dimethylorcinol, preparation of, 51.
 — dibromo-, 51.
 Dimethyloxalic acid, etherification of, 486.
 Dimethyloxamide, 628, 633.
 Dimethylparabanic acid, 628, 629.
 Dimethylparatolylsulphamide, 1283.
 Dimethylphenylphosphine, behaviour of, with ethylene bromide, 958.
 Dimethylpiperideine, a new hydrocarbon from, 983.
 Dimethylpiperidine iodide, 535.
 — methylene iodide, and some of its salts, 535.
 Dimethylpropylalkine, 165.
 Dimethylpropylglycoline, 1195.
 Dimethylquinol, amido-, 302.
 Dimethyl- α -resorcylic acid and its salts, 52.
 Dimethylsuccinic acid, 942.
 Dimethylsuccinimide, 942.
 Dimethylsulphamide, 1282.
 Dimethylsulphainic acid and its ethyl salt, 1282.
 Dimethyltoluidine, orthobromo-, 177.
 Dimethyltoluidinesulphonic acid, and its salts, 177.
 Dimethyltropine hydroxide, 217.
 — iodide and platinochloride, 217.
 α - and β -Dinaphthalene oxide, 1211.
 Dinaphthol, 1068.
 Dinaphthylamine, 179, 972.
 β -Dinaphthyl ether, 736.
 β -Dinaphthylmetadiamidobenzene, 391.
Dianaea, electromotive properties of the leaf of, 638.
 Dioxides, solid hydrated compounds of, with acids, salts, and alkalis, 571.
 Dioxytriphenylmethanecarboxylic acid, 184.
 Diortholeucaniline and its salts, 833.
 Diparatoyl diazobenzene carbamide, 507.
 Diparaxylyl, 188.
 Diphenols, conversion of phenols into, by oxidation, 623.
 Diphenyl, benzoyl and benzyl derivatives of, 62.
 — β -diamido-, 521.
 — diorthamido-, 521.
 — imido-, some derivatives of, 1103.
 — bases, isomeric, transformation of certain aromatic hydrazo-compounds into, 1062.
 Diphenyl carbinol, etherification of, 818.
 Diphenyl ether, 1212.
 Diphenyl ketone, 618.
 Diphenylacetamide, action of phosphorus pentachloride on, 394.
 Diphenylamine, action of benzyl chloride on, 502.
 — action of hydrogen dioxide on, 502.
 — derivatives of, 1059.
 — paranitro-, 1059.
 Diphenylamine-acraldehyde, 1197.
 Diphenylbenzamide, action of phosphorus pentachloride on, 394.
 Diphenylcarboxylic acid, nitro-, and its salts, 521.
 Diphenylchlorophosphine, 306.
 Diphenyldiacetylene, preparation of, and its nitro-compound, 622.
 — orthodiamido-, and its derivatives, 623.
 — orthodinitro-, 619.
 Diphenyldiazobenzene carbamide hydrochloride, 507.
 Diphenyldiethylphosphonium compounds, 306.
 Diphenyldimethylarsonium iodide, 305.
 Diphenyldimethyl-phosphonium iodide, 306.
 Diphenylene oxide, 1211.
 Diphenylethanetricarboxylic acid and its salts, 1071.
 Diphenylethylmethyl-arsonium iodide, 305.
 Diphenylethylmethyl-phosphonium iodide and its derivatives, 306.
 Diphenylethylphosphine, 306.
 Diphenylfumaric acid, 1298.
 Diphenylene and an isomeride of the same, new method of preparing, 521.
 Diphenylmaleic acid, 1298.
 Diphenylmethane, 621.
 Diphenylmethyl-arsine, 305.
 Diphenylmethyl ethylarsonium iodide, 305.
 Diphenylmethyl ethyl-phosphonium iodide, 306.
 Diphenylmethylphosphine, 306.
 Diphenylphosphine, 1062.
 Diphenylphthalide, 184.
 Diphenylthiocarbamide, 395.
 — metamononitro-, 183.
 Diphenylthiocbazide, 1091.

Diphenylthiocarbazone, oxidation and reduction of, 1091, 1092, 1093.
 Diphenylthiocarbodiazone, 1092.
 Diphenylthiodantoin, 296, 298.
 Diphenylvaleric acid, 1077.
 Diphthalyl, 1298.
 Dipiperyltetrazone, 1115.
 Dippel's oil, a third homologue of pyrrolidine in, 529.
 Dipropargyl, heat of combustion of, 721.
 Dipropylacetic acid and its salts, 600.
 Dipropylacetolactone, bromo-, and tribromo-, 946.
 Dipropylacetone, 600, 601.
 Dipropylketine, 166.
 Dipyridyldicarboxylic acid, 1112.
 Dipyridylmonocarboxylic acid, 1112.
 Diquinoline and its oxidation-product, 215.
 α -Diquinoline and its salts, 69.
 Discharge-spark of a condenser, thermic laws of, 678.
 Diseases, plant, researches on, 888.
 Disinfection by the aid of hot air, 1143.
 Disodium glyceride, preparation of, 377.
 Distillery materials, acorns and earth-puffs as, 121.
 Distribution, law of, 456.
 Dithiocarbamic and thiocarbamide, typical connections of, 1090.
 Dithiouethanes, normal, 966.
 Dithymols, isomeric, 624.
 Ditolyl, diamido-, substituted derivatives of, 199.
 —— ketone, 1071.
 Ditolythane, 1071.
 Ditolyloxadiamidobenzene, 504.
 Ditolyloxamide, 181.
 Ditolylphthalide, 185.
 α -Ditolylpropionic acid and its derivatives, 1071.
 Ditolylsuccinamide and its nitro-derivatives, 181.
 Ditolylthiocarbamides, action of alcoholic iodides on, 1090.
 Dixylene and its products of oxidation, 853.
 Dolomite, action of acetic acid on, 659.
 Dowson's apparatus for making a cheap gas for gas motors, 430.
 Dragon's blood, decomposition of, by distillation over zinc-dust, 209.
 Drainage-water collected at Rothamsted, 889.
 Drying apparatus, improved form of, 244.
 Duboisine, new colour reactions of, 341.
 Duck-weed (*Lemna trisula*), composition of, 422.

Dumortierite from Beaunan, near Lyons, and its analysis, 151.
 Du Puy's direct process for making iron from ores, tap-cinder, mill-furnace slag, and hammer scale, 344.
 Dyeing, use of electrolysis in, 1338.
 —— with methylene-blue, 127.
 Dye-stuff from coerulein, 126.
 Dye-stuffs, 503.
 —— from azoanthrol, 976.
 —— from resorcinol, 968.
 —— two new vegetable, 309.
 Dynamite, analysis of, 1327.

E.

Earth-puffs as distillery material, 121.
 Egg, yolk of, 1339.
 Eggs, hen's, amount of cholesterol in, 78.
 Electric arc, appearance of, in vapour of carbon bisulphide, 1157.
 —— —— studies on, 259.
 Electric current produced by light, 352.
 Electric currents, effects of, on the surfaces of mutual contact of aqueous solutions, 260.
 —— —— some effects of transmitting, through magnetised electrolytes, 566.
 Electric discharge, retrogradation produced by, during the conversion of oxygen into ozone, 688.
 Electric furnace, 1241.
 Electric light, influence of, on vegetation, 326, 639.
 —— —— pure carbons for, 1142.
 Electrical tension-differences between a metal and liquids of different concentration, 687.
 —— polarisation, variation in friction produced by, 1257.
 —— researches on plant and animal forms, 638.
 —— storage battery, new, 258.
 Electricity, refraction of, 260.
 Electrodes, disintegration of, by positive electricity, 448.
 —— polarisation of, and conductivity of liquids, 912.
 —— radiant matter from, 3.
 Electrolysis, 789.
 —— limits of, 260.
 —— of phosphoric acid solutions with electrodes of gas-coke and graphite, 852.
 —— of various liquids by means of carbon electrodes, 406, 850.
 —— researches on, 353.
 —— use of, in dyeing and printing, 1338.

- Electrolytes, existence of dielectrical polarisation in, 789.
 — magnetised, some effects of transmitting electric currents through, 566.
 Electrolytic estimations and separations, 425, 896.
 Electromagnet, action of, on various minerals, and its use for their mechanical separation, 656, 810.
 Electro-optic experiments on various liquids, 678.
 Elements, connection between the atomic weight and the chemical and physical properties of, 859.
 — different, identity of spectral lines of, 253.
 — influence of the compressibility of, on the compressibility of their compounds, 1160.
 Ellagic acid, action of nascent hydrogen on, 405.
 — occurrence of, in pine-bark, 82.
 Emerald, cause of the green colour of, 1269.
 — from Santa Fé di Bogota, 575.
 Emodine, amount of, in rhubarb, 1126.
 Encephalin, 235.
 Endothermic compounds in general, explosion of, 453.
 Enstatite, artificial, 286.
 Epichlorhydrin, action of, on aniline and its homologues, 1067.
 Epidote, existence of, in the syenite of the Ravin d'Enval, near Riom (Puy-de-Dôme), 292.
 — from near Greenwood, Albemarle Co., Virginia, 24.
 Equipotential figures obtained by the electrochemical method, theory of, 1156.
 — systems, reversibility of the electrochemical method for the determination of, 352.
 Ericin, 309.
Erigeron canadense, oil of, 64.
 Eruptive rocks, spherulites in, 705.
 Erythrochromium salts, 1168.
 Erythrohydroxyanthraquinone, 856.
 Erythrol, 819.
 — action of nitroalizarin on, 785.
 Erythrozinicate and its optical properties, 281.
 Essential oil of angelica, 410, 1300.
 — — of cinnamon leaves, 1300.
 — — of the fruit of the *Angelica archangelica*, methylacetic and hydroxymyristic acids in, 496.
 — — of the fruit of *Coriandrum sativum*, 525.
 — — of garden sage (*Satureja hortensis*), occurrence of carvacrol in 1065.
 Essential oil of linaloës, 737.
 — — — of *Pinus Pumilio*, 410.
 — — — of *Pistacia Lentiscus*, 208.
 — — — of savory, 737.
 Essential oils, 120.
 — — — spectroscopic examination of, 130.
 Esthesine, 538.
Ethaliun septicum, phytosterin from, 729.
 Ethane, hexchlor-, conversion of, into bromide, 375.
 — nitro-, constitution of, 375.
 — — preparation of, 935.
 Ethenyldiphenyldiamine, 958.
 Ethenylphenylenediamine, 180.
 Ether, &c., filtering siphon for the separation of, 771.
 — of the glycol, $C_{22}H_{14}O_2$, 1299.
 Ethereal nitrates from milk-sugar, 1042.
 — salts, action of haloïd acids on, 493.
 — — — of phenols, simple method for the preparation of, 1288.
 Etherification, additions to the researches on, 817.
 — of alcohols and acids of double function, 485.
 Ethers, aromatic, 1211.
 — of pulvate acid, 1079.
 Ethoxycarbimidamidodinitrophenol, 969.
 Ethoxyethenyltricarboxylic acid, 1191.
 Ethyl acetate, preparation of, 296.
 — — trichlor, 295.
 — — acetoacetate, action of alkalis and nitrous acid on, 1052.
 — — — action of fuming nitric acid on, 1193.
 — — — action of, on the phenols in presence of dehydrating agents, 1289.
 — — — action of phosphorus pentachloride on 711.
 — — — and derivatives of, 1192.
 — — — propyl-derivatives and decomposition-products of, 599.
 — — — and orthonitrophenyl-acetylene, action of potassium ferricyanide on the copper compounds of, 972.
 — — acetocyanacetate and its derivatives, 1280.
 — — alcohol, action of chloride of lime on, 28.
 — — — trichlor, 295.
 — — anthradihydride, 862.
 — — benzyl chloromalonate, 58, 1208.
 — — bromanisate, action of sodium ethylate on, 168.

- Ethyl bromopropionate, action of metals on, 38.
 — caproate and its salts, 711.
 — chloracetoacetate, action of fuming nitric acid on, 1193.
 — chlorocarbonate, action of, on potassium-pyrroline, 606.
 — citraconate, action of ammonia on, 829.
 — — molecular refraction of, 829.
 — comenamate, 197.
 — comenate, 197.
 — cyanate, 937.
 — cyanomalonate and its salts, 1189.
 — cyanurate, 937.
 — diacetoxycomenate, 197.
 — dibromosuccinate, action of ammonia on, 163.
 — diethylacetooacetate, action of phosphorus pentachloride on, 712.
 — dimethyl carbinol, etherification of, 818.
 — dipropylacetooacetate, action of sodium-amalgam, 600.
 — disulphoxide, synthesis of, 831.
 — α -hydroxyphthalate, 405.
 — hydroxytetrolate, 1192.
 — imidosuccinamate, 163.
 — imidosuccinate, 163.
 — indoxanthidate, 110.
 — indoxanthinate, and nitroso-compound and reduction of, 1100, 1101.
 — indoxylate and its nitroso-compound, 198.
 — — oxidation of, and action of nitrous acid on, 1100, 1102.
 — isatogenate, 198.
 — — action of some reagents on, 620.
 — — constitution of, 1101.
 — isethionate, 487.
 — isobutyl chloromalonate, 40.
 — isobutyl carbinol, etherification of, 817.
 — isobutyl malonate, 39.
 — itaconate, 829.
 — mesaconate, molecular refraction of, 829.
 — metaphenylenediglycollate, 957.
 — metaxyl ether, 1283.
 — monochloromalonate, 39.
 — neurostearate, 537.
 — nitroacetoacetate, 949.
 — — products of the decomposition of, 1280.
 — nitrocinnamates, action of bromine on, 841.
 — nitrocomenate, 197, 691.
 — nitropyrogallate, 53.
 — nitrosomalonate and its derivatives, 39.
 — orthamido-cinnamate, 1209.
- Ethyl oxide, dichlor-, symmetrical, 590.
 — — paranitrobromocinnamates, two isomeric, 842.
 — — paranitrocinnamate, dibromide of, 846.
 — — paranitrophenyldibromopropionate, 846.
 — — para- and ortho-nitrophenyldibromopropionate, action of water at high temperatures on, 845.
 — — — and the action of alcoholic potash on, 841, 843.
 — — paraxylyl ether, 1283.
 — — phenyl carbinol, etherification of, 817.
 — — phenylborate, 732.
 — — phenyldithiocarbamate, 299.
 — — propargylpentacarboxylate, 1191.
 — — pyrogallates, action of nitrous acid on, 53.
 — — salts of ethyl- and isobutyl-chloromalonic acid, ethyl- and isobutyl-tartaric acid, ethyl- and isobutyl-hydroxyacetic acid, 39.
 — — succinate, action of the alkali-metals on, 712.
 — — succinopropionate, 713.
 — — succinosuccinate, 712.
 — — sulphate, normal, 487.
 — — sulphoxide, action of chlorine on, 939.
 — — teracylate, 46.
 — — tetrone-carbonate, 606.
 — — thiobenzenesulphonate, synthesis of, 832.
 — — thioethylsulphonate, synthesis of, 831.
 — — thioparatoluenesulphonate, synthesis of, 832.
 Ethylacetyl comenate, 197.
 Ethylanthracene, 863.
 Ethylanthrol and its nitro-derivative, 859.
 Ethylbenzene, paramido-, 1284.
 — — paranitro-dichlor-, 847.
 — — synthesis of, 952.
 Ethylbenzophenone, 1293.
 Ethylbetaïne-compounds, action of potassium hydroxide on, 720.
 Ethylbromotarconic acid and its salts, 871.
 Ethylbromo α carconium iodide, 870.
 Ethyl-carbestyryl, 201, 732, 1209.
 — — — action of reducing agents on, 1209.
 — — — preparation and derivatives of, 1209.
 Ethyl-cedriret, Hofmann's, 54.
 Ethylchloromalonic acid, ethyl salt of, 39.
 Ethylcinchonidine, brom-, oxidation of, 228.
 Ethyldeoxybenzoïn, 1292.

Ethyldimethylphenylphosphonium-bromide, bromo-, 958.
 Ethyldinitrohydroxyanthraquinone, 863.
 Ethylene bromide, action of nitric acid on, 815.
 —— some reactions of, 1179.
 —— tetranitro-, 815.
 Ethylene, liquid, use of, for producing low temperatures, 914.
 —— tetrachlor-, conversion of, into bromide, 375.
 —— phenylimidophenylthiocarbamate, 723.
 Ethylenediamine, preparation and properties of, 939.
 —— hydroxide, 940.
 Ethylenediparolyldiamine, action of carbonic chloride on, 183.
 Ethylenediphenyldiamine, action of carbonic chloride on, 182.
 Ethylene-hexphenylphosphonium bromide, 1063.
 Ethylenehydromethylpyridine (tropidine), 1206.
 Ethylenetetrahydridamine, 1194.
 Ethylflavaniline and its salts, 1067.
 Ethylglycolic acid, trichlor-, and its salts, 295.
 Ethylguaiacol, 54.
 Ethylideneamidobenzoic acid, 303.
 Ethylindoxyl, 199.
 —— nitrosamine of, 1102.
 Ethylindoxyclic acid, 198.
 Ethylmethycatechol, 54.
 Ethynaphthalene and some of its derivatives, 410.
 Ethyl- β -naphthol, 736.
 Ethynaphthol, 410.
 Ethylnitrous acid, 711.
 Ethylorthamidotoluene, and its derivatives, 1284.
 Ethyloxylantranilic acid, 1101.
 Ethyloxanthranol, 861.
 Ethyloxanthanyl chloride, 862.
 Ethyloxycarbostyrol, 202.
 Ethylphenyldithiurethane, 966.
 Ethylphosphobetaine compounds, action of heat on, 720.
 —— etho-bromide, and iodide, 720.
 —— ethochloride, and the action of silver oxide on, 719.
 —— hydrochloride, hydrobromide, and hydriodide, 719.
 Ethylpiperidinemethylene iodide and its derivatives, 534.
 Ethyl-propionyl carbamide, 1052.
 Ethylquinoline bromide, bromo-, and its derivatives, 530.
 Ethylsalicyl alcohol, 174.
 Ethylstilbene, 1292.
 Ethylsulphonic acid, action of chlorine on, 939.

Ethylsulphuric acid, bromo-, 1179.
 Ethyltartronic acid, 39.
 Ethylthiocarbonanilide and its salts, 166.
 Eudiometer, a new, 551.
 Eugenol, nitro-, and its derivatives, 1200.
Eurotium oryzæ ferment, use of, in Japan, 247.
 Euxanthone, and derivatives of, 1301.
 Evergreens, action of frost on, 549.
 Ewes' milk as influenced by fodder, 1309.
 —— composition of, 541.
 Explosions in gases, propagation of, 1260.
 Explosive wave, production of the, 685, 1261.
 Extractive matter, estimation of, in wine, 999.
 Eye, physiological and pathological chemistry of, 759.

F.

Factory waste-water and gases, influence of, on vegetation and soil, 331.
 Fat, estimation of, in milk by the lactobutyrometer and Soxhlet's aræometer, 109.
 —— extraction of, from bones by light petroleum, 123.
 —— formation of, in animals, 238, 878.
 —— human, chemical composition of, at different ages, 240.
 —— in milk, comparative estimation of, by weight; the lactobutrometer, and a new aræometric method by Soxhlet, 778.
 —— in skim-milk, aræometric estimation of, 1138.
 —— part played by, during the germination of seeds, 883.
 —— vegetable, analysis of, 886.
 Fat acid, new, occurrence of, in the nut of the California bay tree, 1186.
 Fat oils, separation of hydrocarbon oils from, 108.
 Fats, animal and vegetable, estimation of free acids in, 429.
 —— foreign, detection of, in butter, 1003.
 —— quantitative separation of rosin from, 663.
 —— vegetable, presence of free fatty acids in, 421.
 —— vegetable and animal, proportion of free fatty acids in, 239.
 Fatty acids, bibasic, condensation-products of, 1074.

- Fatty acids containing the isopropyl group, action of nitric acid on, 162.
 —— crude, formation of sebacic and suberic acids by the distillation of, in superheated steam, 715.
 —— estimation of neutral fat in mixtures of, 1236.
 —— free, in cows' milk, 987.
 —— —— presence of, in vegetable fats, 421.
 —— solid, preparation of, 1147.
- Fatty matters, brominated, action of nitric acid on, 36.
 —— digestion of, 1119.
- Fatty series, constitution of the nitro-products of, 935.
- Faure secondary battery, experiments with, 680.
- Fayalite slags from the Freiberg furnaces, containing zinc-spinell, 476.
- Feeding, effect of, on the weight of animals, 77.
 —— experiments at Woburn, 1880, 649.
- Fehling's solution, action of gluconic, saccharic, lactonic, and mucic acids on, 429.
 —— reducing power of grape-sugar for, 104.
- Felspar accompanying microlite in Amelia Co., Virginia, 23.
 —— from rhombic porphyry of Christiania, 22.
- Felspar-basalts, 1037.
- Fen lands, manuring, with kainite, 771.
- Fergusonite from Burke Co., North Carolina, 151.
- Ferment, alcoholic, researches on the physiology and morphology of, 80.
 —— *Eurotium Oryzae*, use of, in Japan, 247.
 —— gastric, soluble and insoluble modifications of, 752.
 —— nitric, alterations in the properties of, by cultivation, 79.
 —— peptone-forming, in plants, 880.
- Fermentation, putrid, of protein substances, mechanism of, 1115.
 —— retardation of, by certain substances, 80.
 —— schizomyctic, 1121.
- Fermented liquids, presence of furfural in, 941.
- Ferments, &c., action of hydrogen dioxide on, 1122.
 —— diastatic, action of, on starch, dextrin, and maltose, 749.
 —— influence of certain substances on, 881.
 —— soluble, action of, 536.
 —— some, behaviour of, in the animal system, 637.
- Ferments, unorganised, behaviour of, at high temperatures, 317.
- Ferric chloride, behaviour of, to albumin, 1141.
 —— oxalate, photochemical reaction of, 911.
 —— salts, tests for, 556.
- Ferrocyanides, some, heat of formation of, 791.
- Fermomanganese, preparatory treatment of manganese ores for the production of, in the blast-furnace, 1144.
 —— used in puddling fine-grained iron, 344.
- Ferro-oxalate-citrate developer, 1009.
- Ferro-silicon, use of, in castings, 118.
- Ferrous oxide, estimation of, in the presence of ferric oxide, organic acids, and sugar, 98.
 —— titration of, with permanganate, in presence of hydrochloric acid, 1323.
 —— salts, oxidation of, 572.
- Ficus elastica*, examination of, 989.
- Field experiments at Woburn, 1880, 649.
- Figures, equipotential, obtained by the electrochemical method, theory of, 1156.
- Lichtenberg's, explanation of, 448.
- Filtering siphon for the separation of ether, &c., 771.
- Fisac acid, 1083.
- Flame of a Bunsen burner, luminosity of, induced by heating the tube, 256.
 —— —— the Bunsen lamp, action of air in rendering the, more luminous, 129.
 —— properties of, 568.
- Flames, retrograde and sensitive, 568, 569.
- Flavaniline and its derivatives, 1066.
- Flavoline, 1067.
- Flour, microscopical examination of, 559.
 —— rendered uneatable by free fatty acid, 123.
 —— paste, colouring matter in, 739.
- Fluavil, 308.
- Fluellite, composition of, 1176.
- Fluids, digestive, 1119.
 —— state of, at their critical temperature, 268.
- Fluoanisic acid, 615.
- Fluobenzoic acids, three isomeric, and their salts, 613.
- Fluorescein, constitution of, 1096.
 —— reactions, 968.
 —— chloride, phthalin of, 1097.
- Fluorine, affinity values of, 137.
 —— free, occurrence and formation of, 8, 459.

- Fluotoluic acid, 614.
 "Flux" of soap, so-called, 784.
 Fodder, contributions from the experimental station at Halle on, 422.
 —— examination of a mixture of weed-seeds used as, 1226.
 —— experiments on milch cows with cotton-seed meal and peanut meal, 321.
 —— green, modifications of composition which it undergoes when preserved in pits, 329.
 Fodder-cabbages, 423.
 Fodder-plants, leguminous, proportions of nitrogen, ash, and phosphoric acid in successive cuttings of, 649.
 Fodders, diastatic action of some, 1128.
 —— Italian, composition of, 1127.
 —— valuation of, 549.
 —— various, preparation and preservation of, 1128.
 Food, "*canna edulis sterilis*" as, 990.
 —— influence of irregular work on the digestion of, by horses, 319.
 Forest lands, changes effected by cultivation of, 1129.
 —— seeds, some, composition of, 643.
 Formaldehyde, 1277.
 Formamide, monobromo-, 1052.
 Formates, action of heat on, 1050.
 —— metallic, decomposition of, in presence of water, 494, 496.
 —— theory of, 496.
 Formic acid, thermal and volumetric researches on, 3.
 Formorthonitranilide, 181.
 Fossil eggs in guano, composition of, 1310.
 —— resin from the coal beds of Upper Silesia, 285.
 Four-course rotation, 1225.
 Fourth state of matter, 266.
 Fractional distillation, apparatus for, 551.
Fraxinus americana, bark of, 1150.
 Free acids, estimation of, in animal and vegetable fats, 429.
 Fresenius-Babo's test for arsenic, 555.
 Friction produced by electrical polarisation, variation in, 1257.
 Frieseite from Joachimsthal, 574.
 Frost, action of, on evergreens, 549.
 Fruit of *Omphalocarpum Procera*, 307.
 —— trees, effect of pruning the tops and roots of, on their development, 1224.
 —— manuring of, 93.
Fucus amygdaceus, carbohydrate from, 939, 1044.
 —— complete analysis of, 1044.
 Fuel, consumption of, in house stoves, 1331.
 Fuel, examination of, 773.
 —— of the future, water-gas as, 114.
 Fumaric acid, action of acetic chloride and acetic acid on, 828.
 —— conversion of, into maleic acid, 389.
 —— etherification of, 383.
 Furfuraldehyde, action of acetone on, in presence of alkaline solutions, 513.
 —— and its derivatives, 499.
 —— presence of, in fermented liquids, 710, 941.
 —— production of, by the dry distillation of wood, 296.
 Furil, and its bromo-compounds, 499.
 Furilic acid, 500.
 Furnace gases, hurtful constituents of, and their removal, 1333.
 Furnace-linings, basic, preparation of, for dephosphorising pig iron, 1012, 1334.
 Furoin, 499.
 Fusel-oil, cause of Jorissen's reaction for, 1002.
 —— —— detection of, in spirit, 429.
 —— —— qualitative and quantitative estimation of, in alcohol and brandy, 339, 1235, 1327.

G.

- Gabbros near Prato, 586.
 Galactin, 707.
 Galanga root, substances obtained from, 208.
 Galangin, 209.
 —— and its derivatives, 866.
 Gallacetonin and its monacetate, 1290.
 Gallacetophenone, colouring matter from, 1288.
 Gallein, and its derivatives based on triphenylmethane and phenylanthracene, 58, 60, 61.
 —— manufacture of, 126.
 —— dibromo-, 61.
 —— tetracyldibromo-, 61.
 Gallic acid, modification of Pettenkofer's test for, 108.
 Gallin, 59, 61.
 Gallium, separation of, 897, 1323.
 —— oxychloride, 698.
 —— protochloride, decomposition of, by water, 1167.
 —— salts, reactions of, 364.
 Gallop, 59, 61.
 Galvanic cell, chemical work done by, 1257.
 —— circuits and batteries, application of the telephone to the estimation of resistance in, 789.

- Galvanic elements which consist only of elementary substances, 679.
 — polarisation and Smee's element, 1155.
 Gas, boiling and heating with, 115.
 — analysis, a new apparatus for, 1229.
 — densities, estimation of, 771.
 — dissolved in a liquid, influence of the quantity of, on the surface tension of the latter, 1259.
 — explosions, danger of, 920.
 — extinguisher, automatic, 1243.
 — manufacture, utilisation of residues from, 1181.
 — motors, Dowson's apparatus for making a cheap gas for, 430.
 — relation between the pressure, volume, and absolute temperature of a, 686.
 — separation of ammonia from, 1331.
 Gaseous and liquid states, 688.
 Gases, absorption of, by platinum, 1022.
 — absorption of, by solids, 272.
 — compressibility of, 686.
 — critical state of, 267.
 — electrical resistance of, 681.
 — flow of, 568.
 — incomplete combustion of, 455.
 — influence of pressure and temperature on the surface condensation of, 270.
 — noxious, evolved in the manufacture of ammonia from liquid sewage, destruction of, 115.
 — permanent, estimation of the specific gravity of, at high temperatures, 1159.
 — propagation of explosions in, 1260.
 — rarefied, elasticity of, 1259.
 — solubility of, in absorption liquids, 1132.
 — — — in vulcanised caoutchouc, 1132.
 — — — solids in, 271.
 — some points in the construction of an apparatus for the accurate analysis of, 1131.
 — specific heats of, at high temperatures, 449.
 — velocity of the propagation of explosion in, 685.
 Gastric digestion, 753.
 — ferment, soluble and insoluble modifications of, 752.
 — glands, microzymas of, and their digestive power, 1118.
 — juice, 1220.
 — — — microzymas of, 752.
 Gelatin, photographic, analysis of, 111.
 — jelly as a dialyser, 663.
- Gelatin, plates for diapositives, 1142.
 Gelatino-bromide emulsion, 902.
 Gelose, Payen's, 1044.
 Gelsemic acid, is it identical with aesculin? 1109.
 Gelsemine, forensic chemical estimation of, in animal liquids and tissues, 1141.
 Gelsemium poisoning, 1109.
Gelsemium sempervirens, observations on the preparation, properties, and recovery when absorbed, of the important constituents of, 1109.
 Gentisic acid, 52.
 Gentisic aldehyde, 52.
 Germination, development of heat during, 242.
 Gilbertite, 473.
 Ginger, ethereal extract of, 626.
 Gingerol, 627.
 Glass, action of sulphur on, 696.
 — — — sunlight on, 352.
 — — — oxides of nitrogen on, at a high temperature, 361.
 — application of natural silicates in the manufacture of, 1245.
 — method of printing and burning in of names, monograms, &c., on, 785.
 — mixtures, 1245.
 — nature of, 563.
 — new method of painting on, 127.
 — rule for calculating the composition of, 563.
 — silvering, application of glycerol to, 1256.
 — silvering of, 127.
 — variation of the electric conductivity of, with temperature, density, and chemical composition, 680.
 Glauberite, &c., 577.
 Glaze for paper and pasteboard, 444.
 Globularietin, 1225.
 Globularia, composition of, 1224.
 Glucinum, atomic weight of, as determined by its physiological action, 701.
 Glucosides, spectra of, 349.
 Glue, a substitute for, 444.
 Glutaric acid (normal pyrotartaric acid), transformation products of, 1189.
 Glutaramide and derivatives of, 1190.
 Gluten, 537.
 Glyceraldehyde, 1308.
 — hydrate, 1308.
 Glyceroboric acid, calcium and sodium salts of, 1244.
 Glycerol, detection of, 104, 557.
 — electrolysis of, 407.
 — estimation of, 898.
 — detection of, in beer, 557.
 — — — in sweet wines, 1235.

- Glycerol diformin, 378, 389.
 — oxidation of, by potassium permanganate, 818.
 — recovering, from spent soap leys, 782.
 — reducing action of, on silver salts, and its application to silvering glass, 1256.
 Glyceryl dibromhydrin, etherification of, 817.
 — ether, 31.
 — xanthates, 164.
 Glycocholic acid, some properties of, 1218.
 Glycogen, 322.
 — elementary composition of, 491.
 — nitro-, 159.
 — precipitation of, 1043.
 — quantitative estimation of, 558.
 Glycol, $C_{22}H_{14}O_2$, ether-of, 1299.
 — a, of the aromatic series, 730.
 Glycoleines, 1194.
 Glycolines, 1194.
 Glycollic acid, etherification of, 486.
 Glycol monochlorhydrin, etherification of, 817.
 Glycosalicylamidoacetic sulphite, 305.
 Glycosalicylamidocaproic sulphite, 305.
 Glycosalicyl sodium sulphite, 305.
 Glycuronic acid, 952.
 Glyoxaline, 166, 821.
 — constitution of, 1064.
 Gneiss, analysis of, 1177.
 — existence of a new mineral species in, from Beaunan, near Lyons, 151.
 Goats' milk, composition of, 541.
 "Göldbleiben," a disease of hops, 990.
 Göthite, artificial pseudomorph of, 576.
 Gold dispersed in sulphides, amalgamation of, 120.
 — dull, cleaning of, 1145.
 — native, from Virginia, 20.
 — chloride, action of charcoal on a solution of, 809.
 — and silver telluride (krennerite) from Nagajag, 581.
 Grain, gelatinised, for brewing, 1337.
 — sprouted, to what extent is it capable of further germination? 987.
 Graminivora, loss of substance experienced by starving, 416.
 Gramme machine, effects produced in a vacuum by the current from, 913.
 Granite, analysis of, 1177.
 Granulites, Saxon, occurrence of titanium minerals in, 580.
 Grape-juice, analysis of, 81.
 Grass-seeds, influence of light on the germination of, 882.
- Grape-sugar, crystallised anhydrous, 706.
 — — — decomposition of, by alkalis, 378.
 — — — preparation of, and its titration with Knapp's solution, 1275, 1276.
 — — — preparation of, by Neubauer's modification of Schwarz's method, 1275.
 — — — reducing power of, for Fehling's solution, 104.
 — — — reducing substance formed by the action of potassium hydroxide on, 490.
 — — — reduction of cupric oxide by, in neutral solutions, 558.
 Grapes, influence of light on the ripening of, 419.
 Graphitic acid, 850.
 Grasses, American, composition of, 762.
 Green fodder, modifications of composition which it undergoes when preserved in pits, 329.
 Greenstones, investigations of, 588.
 Grignon, experiments at, in 1881, 1314.
 Group containing two carbon-atoms, protection of, 1196.
 Guaiacol, derivatives of, 54.
 — potassium sulphate, 54.
 Guaiacolsulphonic acid, potassium salt of, 54.
 Guaiacum, decomposition of, by distillation over zinc-dust, 210.
 Guaiac, constitution of, 593.
 Guaiene, 211.
 Guanidine carbonate, action of, on phenylthiocarbimide in presence of water, 395.
 Guanidines, substituted, 191.
 Guanine, crystalline, 27.
 Guano, Peruvian, phosphoric acid in, 1316.
 Guanylphenylthiocarbamide, 395.
 Guinea-pigs, albuminoïds of the *vesicula seminalis* in, 543.
 Gum arabic, 591.
 — — — estimation of, 1323.
 — — — influence of, in certain chemical reactions, 1322.
 Gunnisonite, a new mineral from Colorado, 1176.
 Gypsum, effect of, on the constitution of wine, 434.
 — estimation of, in wine, 96.
 — manures, 1316.

H.

Hæmatite, artificial pseudomorph of, 576.
 Hæmoglobin, importance of light for the formation of, 751.
 Halogenated compounds, action of caustic alkalis on acetone solutions of, 491.
 Halogens, 7.
 —— comparison of the combining energies of, and of sodium with different organic residues, 934.
 —— influence of mass on the mutual substitution of, 457.
 Haloïd salts, isomeric state of, 355.
 —— —— of silver and potassium, thermal phenomena attending the formation of, 1019.
 —— —— of the metals, action of lead and manganese dioxides on, in presence of acetic acid, 1132.
 Hay grown on hills and meadows, composition of, 766.
 —— grown under the influence of different manures, composition of, 1127.
 Heat developed by magnetisation, 1019.
 —— development of, during germination, 242.
 Heat of combustion of pinacone, 356.
 —— —— solid trimethyl carbinol, 356.
 —— —— some members of the fatty series, 567.
 —— —— relation between refractive power and, 567.
 Heat of formation of calcium oxychloride, 452, 682.
 —— —— of nitrogen sulphide, 460.
 —— —— of water, 135, 682.
 Heat of solution of some mixtures of salts, 1257.
 Heat and rain, distribution of, during the growth of beet, 990.
 Heats of combustion of hydrocarbons, 916.
 Helicin, 303, 412.
 —— action of urea on, 412.
 Heliographic engravings in lines and half-tones, 1008.
 —— printing, 1009.
 Hellebore root, black, rhizomes of, 1125.
 Hemipinic acid, amido-, barium salt of, 408.
 —— —— derivatives and constitution of, 1206.
 —— —— nitro-, and its salts, 402.
 —— anhydride, 403, 1207.
 Hemp cake and its adulteration, 84.
 Hemp seed, composition of crystallised albumin from, 876.

Hens, phosphorus poisoning in, 544.
 Heptadecylamine, 1054.
 Heptadecylstearyl carbamide, 1053.
 Heptalactone, 42, 45.
 Heptylamine, 1054.
 Heptyloctoxycarbamide, 1053.
 Heraphathite, influence of morphine on the formation of, 1005.
 Herbivora, formation of phenol, indole, and skatole in, 240.
 —— intestinal gases of, 240.
 —— starving, consumption of tissue in, 749.
 Herschelite from Etna, 284.
 Heulaudite, 582.
 Hexane, dinitro-, 825.
 γ-Hydroxyldiphenyl, 405.
 Hexmethyltrimethylenediamine bromide, 500.
 Hexylamine, normal, 1054.
 Hexylene, action of chlorine dioxide on, 1039.
 Hexynitrous acid, 710.
 Hexylanthylcarbamide, 1053.
 Hieralite, a new mineral, 704.
 Holland's process for melting iridium, 703.
 Homocerebrin, 235.
 Homocinchonidine, 228.
 Homohydrapoitropine and its salts, 1218.
 Homologous bodies, influence of the molecular weight of, on the course of incomplete reactions, 384.
 Homopyrroline-carboxylic acid, 213.
 Honey, detection of adulterated or artificial, 1327.
 Hops, estimation of pollen in, 1331.
 —— “Göldbleiben” a disease of, 990.
 Horses, digestion in, 1119.
 —— influence of irregular work on digestion of food by, 319.
 House stoves, consumption of fuel in, 1331.
 Huantajaite, 472.
 Human fat, chemical composition of, at different ages, 240.
 —— milk, 758.
 —— saliva, mixed, composition of, 754.
 Humus matter, absorptive capacity of, 889.
 Hydantoin in plants, 243.
 Hydramide of the fatty series, 164.
 Hydrapoitropine, action of potassium permanganate on, 1217.
 Hydrates formed under pressure and by sudden expansion, 1163.
 Hydratropic acid, α-amido-, nitril, and salts of, 57.
 —— chlor., 520.
 Hydrazine-benzoic acids and their derivatives, 1068.

- α -Hydrazobenzenesulphonic acid and its salts, 517.
 Hydrazo-compounds, molecular rearrangement of some, 1062.
 Hydroazobenzene, preparation of, 965.
 Hydrobilirubin, Maly's, 233.
 Hydrobromic acid, preparation of, 138.
 —— use in analysis, 138.
 Hydrocaffuric acid, 217.
 Hydrocarbon, $C_{12}H_{20}$, 627.
 —— $C_{15}H_{16}$, 1293.
 —— new, from *Sequoia gigantea*, 208.
 —— oils, separation of, from fat oils, 108.
 Hydrocarbons, aromatic, oxidation of para-substitution-products of, 186.
 —— oxidation of substitution-products of, 1196.
 —— synthesis of, 952, 1196.
 —— some new, 202.
 —— from American and Caucasian petroleum, decomposition of, at low temperatures, 27, 374.
 —— from purpurogallin, 1066.
 —— heats of combustion of, 916.
 —— normal saturated, boiling points of, 374.
 —— obtained from colophony, 737.
 Hydrocarbostyryl, 1209.
 Hydrocellulose and its derivatives, 378.
 Hydrochloric acid, liquid, physical constants of, 266.
 —— preparation of, 278.
 —— preparation of, from calcium chloride, 563.
 Hydrocinchonidine, occurrence and behaviour of, 982.
 Hydrocinnamic acid, and its derivatives, 1073.
 Hydroquinine, Hesse's, 1306.
 Hydrocyanic acid, detection of poisoning by, after a long time, 246.
 Hydroeugenol, amidochlor-, and its hydrochloride, 1201.
 Hydroferricyanic acid, 790.
 Hydroferrocyanic acid, and of some ferrocyanides, heat of formation of, 791.
 Hydrogallein, 59, 61.
 Hydrogen, absorption of, by platinum, 1022.
 —— refraction-equivalents of, in organic compounds, 133.
 —— spectrum of, 129, 250.
 —— nickel sulphide, 1032.
 —— peroxide, action of, on ammoniacal nickel sulphate, 1262.
 —— and its application, 1245.
 —— electrolysis of, 1157.
 —— formation of, during combustion, 691.
 Hydrogen peroxide, formation of, in oxidation processes, 795, 798.
 —— phosphide spontaneously inflammable, 461.
 —— sulphide, action of, on saline solutions of nickel and other metals of the same group, 1031.
 —— —— decolorising properties of, 781.
 —— —— formation of, from sulphur, and water, 801.
 —— —— hydrate of, 1027.
 —— and oxygen, combination of, by electric discharge, 360.
 —— —— temperature of combustion of a mixture of, 453.
 Hydromellic acid, obtained by the electrolysis of an alkaline solution, with carbon electrodes, 850.
 Hydroparacoumaric acid, 514.
 Hydrophthalic acid, etherification of, 384.
 Hydropyrocinchonic acid and its salts, 1305.
 Hydroquinidine and its salts, 174, 1113, 1306.
 —— occurrence and behaviour of, 982.
 Hydroquinine and its salts, 1113.
 Hydroquinizarin, 856.
 Hydroquinizarol, 856.
 Hydroxyanthracene, 857.
 Hydroxyanthraquinone, reduction of, 857.
 Hydroxyazobenzene, sulphonic acids of, and their derivatives, 1074.
 Hydroxybenzoic acids, three, decomposition of the calcium salts of, by dry distillation, 616.
 Hydroxybenzyleneamidobenzoic acid, 303.
 α -Hydroxybutyric acid, 37.
 Hydroxybutyric acid, brom-, 598.
 γ -Hydroxybutyric acid, normal, and its salts, 497.
 β -Hydroxycinchoninic acid and its salts, 226.
 Hydroxycomenamic acid, 197.
 Hydroxycomenic acid, 197, 601.
 Hydroxydiethylacetic acid, 56.
 Hydroxyethyltheobromine, 629.
 α -Hydroxyglutaric acid, occurrence of, in molasses, 1190.
 Hydroxyheptylic acid and its salts, 44, 45.
 Hydroxyhydanthranol, and its acetyl-derivative, 856.
 —— oxidation of, 856.
 α -Hydroxisobutyric acid, 37.
 Hydroxyisocaproic acid and some of its salts, 34.
 γ -Hydroxyisophthalic acid, 1297.
 Hydroxyisoxyloquinone, Fittig's, 1200.

- Hydroxylamine, action of, on acetone, 1047.
 —— poisonous action of, 1222, 1231.
 Hydroxylation by direct oxidation, 195.
 Hydroxynaphthaquinone, 854.
 Hydroxynitromesitylene, 1200.
 Hydroxyoctylic acid, 936.
 Hydroxyoleic acid, 1147.
 Hydroxyorganic acids, 598.
 Hydroxyparatolic acid, 186.
 Hydroxyphthalic acid, 193.
 Hydroxypropylbenzoic acid, 840.
 Hydroxyquinoline, 223, 1111.
 α -Hydroxyquinoline, 869.
 β -Hydroxyquinoline and its salts, 227.
 Hydroxyquinone, behaviour of, on oxidation, 207.
 Hydroxytetrolic acid, 1193.
 Hydroxytoluic acid and its salts, 193, 607.
 Hydroxyvaleric acid, salts of, 35, 36.
 Hyoscine, hydriodide of, 229.
 —— hydrobromide of, 229.
 Hyoscyamine, crystalline, 535.
 —— new colour reaction of, 341.
 Hypocaffeine and its salts, 217.
 Hypochlorites, estimation of chlorate in, 94.
 —— formation of, from chlorides by the action of the electric current, 925.
 Hyponitric acid, behaviour of, with sulphuric acid, 1010.
 —— basicity of, 926.
 —— —— new method of preparing, 1027.
 Hypophosphite of iron, sodium, calcium, and magnesium, preparation of a solution containing, 670.
 Hypophosphoric acid and its salts, Part III, 461, 1264.
 Hypoquebrachine, 743.
 Hypoxanthine, distribution of, in the animal and vegetable kingdom, 79.
 —— occurrence of, in potatoes, 1125.
 —— origin of, in the organism, 759.
- I.**
- Ice, alleged heating of, under low pressures, 355.
 Inactose, preparation of, 490.
 Incandescent lamps, use of, for photographic purposes, 1240.
 Indicators for alkalimetry, 774.
 Indigo, artificial, 442, 1100.
 Indigo-blue, fixation of alumina as a discharge on, by means of aluminium chloride, 676.
Indigo femelle, examination of, 989.
- Indigo-group, compounds of, 198, 619, 1100.
 Indium, electrical properties of, 262.
 Indo-in, 198, 620.
 Indole, formation of, in the intestines of herbivora, 240.
 Indophenols, 675.
 Indoxyl, 198.
 —— nitros-, 1102.
 Indoxyl-compounds, 198.
 Indoxylic acid, 198.
 Indoxylsulphonic acid, potassium-salt of, 199.
 Ink for photography and phototyping, 114.
 Intestinal digestion, 1119.
 Intestines of herbivora, formation of phenol, indole, and skatole in, 240.
 Inulin, alkali-compounds of, 491.
 Invertin, influence of, on the fermentation of cane-sugar, 1277.
 —— temperature at which it is destroyed, 378.
 Iodammonium iodide, 8.
 Iodides, action of mercuric ethide on, 409.
 —— of the alkali-metals, action of lead oxide on, 695.
 Iodine, action of lead peroxide on, 143.
 —— behaviour of, with sulphuric anhydride and the hydrates of sulphuric acid, 803.
 —— electric conductivity of, 679.
 Iodoform, action of mercuric ethide on, 409.
 —— solvents for, 1013.
 —— reaction, 107.
 Iridium, Holland's process for melting, and some of its properties, 703.
 Iron albuminate, 1141.
 —— analysis of, with special reference to the estimation of carbon and silicon, 1134.
 —— colorimetric estimation of carbon in, 98.
 —— dephosphorising, in the Bessemer process, 118.
 —— direct separation of manganese from, 97.
 —— Du Puy's direct process for making, from ores, tap-cinder, mill-furnace slag, and hammer scale, 344.
 —— estimation of phosphorus in, 338, 897.
 —— fine-grained, ferromanganese used in pudding, 344.
 —— galvanising of, 119.
 —— influence of manganese on the strength of, 781.
 —— investigation of, 426.

- Iron meteorites, orientation of the cleavage planes in, by means of Widmannsttt's figures, 153.
 —— ore, containing manganese, from the neighbourhood of St. Petersburg, 471.
 —— —— containing both phosphoric and titanic acids, analyses of, 777.
 —— —— investigation of, 426.
 —— separation of magnesium from, 97.
 —— strength of, at low temperatures, 345.
 —— and aluminium, quantitative separation of, 426.
 —— and manganese, separation of, 426.
 —— chromium, and aluminium, reactions of the acetates of, 825.
 Irrigating water and its action, alteration in the composition of, 655.
 Isatamidobenzoic acid, 304.
 Isatinamidoacetic sulphite, 305.
 Isatogenic acid, 198.
 Isatogensulphurous acid, 621.
 Isatropic acid, 740.
 Isoamylidene bromide and chloride, action of ammonia on, 216.
 Isoamylideneamidobenzoic acid, 304.
 Isoanthraflavic acid, tetranitro-, 975.
 Isobenzylidiphenyl, 202.
 Isobutaldehyde, action of hydrochloric acid gas on, 32.
 —— condensation-products of, 161.
 —— new derivatives of, 1278.
 Isobutylal, compound obtained in the preparation of, 32.
 Isobutylaniline and its salts, 1059.
 Isobutylanthracene, 863.
 Isobutyl-anthradihydride, 862.
 Isobutylbenzene, synthesis of, 952, 1196.
 Isobutyleneamidobenzoic acid, 304.
 Isobutyl-glycol in wine, 1249.
 Isobutyl-hydrantranol, 862.
 Isobutylhydroxyacetic acid,
 Isobutylmalonic acid, 39.
 Isobutylmethyllamine, 1054.
 Isobutylmethylketonesulphonie acid, sodium salt of, 943.
 Isobutylxanthranol, 861.
 Isobutylphenol, 727.
 —— synthesis of, by means of anhydrous magnesium chloride, 838.
 Isobutylphenolsulphonic acid, 727.
 Isobutyltartaric acid, 40.
 Isobutylvalerylcaramide, 1053.
 Isobutyramide, monobrom-, 1052.
 Isobutyric acid, α -amido-, hydrochloride of, 56.
 —— bromide, α -brom-, action of zinc methide on, 37.
 Isobutyronitril, α -amido-, 56.
 Isocaproic acid, dibrom-, 42.
 —— lactone of, 34.
 Isocholanic acid and its salts, 873.
 Isodibutylene, oxidation of, by potassium permanganate, 936.
 Isodihydrocornicularic acid, lactone of, 1077.
 Isoheptoic acid from β -hexyl iodide, and its salts, 40.
 Isohydrobenzoic carbonate, 853.
 Isomalic acid and its salts, 40.
 Isomorphism, 1269.
 Isomorphous admixture, a curious case of, trichromates and tetrachromates of potassium and of ammonium, 146.
 Isopentyl alcohol, action of chloride of lime on, 30.
 Isophthalic acid, some derivatives of, 1294.
 Isopropyl chloride, action of hydriodic acid on, 294.
 Isopropyl-isobutyrylcarbamide, 1053.
 Isopropylmetacresol, synthesis of, by means of anhydrous magnesium chloride, 838.
 Isopropylpiperidine, 535.
 Isopropylsuccinic acid, 717, 948.
 Isoserin or amidolactic acid, 38.
 Isosuccinic acid, action of bromine on, in presence of water, 40.
 Isovaleric acid, action of nitric acid on, 162.
 Isoxylamide, 187.
 Isthmus of Panama, waters of, 1178.
 Itaconamide, 1281.
 Itaconanilide, 1281.
 Itaconic acid and its derivatives, 829, 1281.
 Italian fodders, composition of, 1127.

J.

- Jaborandine, nitrate and hydrochloride of, 1115.
Jacaranda procera, analysis of the leaves and bark of, 764.
 Japanese meteorites, two, 814.
 Jarosite from a new locality, 577.
 Jolly's hypothesis as to the cause of the variation in the proportion of oxygen in the atmosphere, 278.
 Jorissen's reaction for fusel-oil, cause of, 1002.
 Juices, variation in the coefficient of purity of, a consequence of sp. gr., 1146.

K.

Kainite, estimation of potassium sulphate in, 96.
 — manuring of fen lands with, 771.
 — manuring with, 92.
 Ketine and nitroso-acetone, 941.
 Ketines and nitroso-compounds, 940.
 Ketonedicarboxylic acid and its salts, 949.
 Ketones, condensation of, with aldehydes, 511.
 — dinitro-derivatives from, 824.
 — nitro-acids derived from, 710.
 — Popoff's law of the oxidation of, notes on, 594.
 Ketonic acids, action of sodium thiosulphate on, 1051.
 Kidney beans, loss of water from, when ripening, 243.
 Kieserite, 149.
 Knapp's solution for estimating sugar, precautions required in using, 558.
 Königsberg, manuring experiments at, 1130.
 Kola nuts, analysis of, 1125.
 Koumiss, peptonisation of albuminoïds in, 1221.
 Krennerite from Nagjag, 581.
 Krugite, 149.

L.

Laboratories, ventilation of, 1332.
 Labradorite, hydrated, 289.
 Lactic acid, amount of, in muscle, 539.
 — — amido-, or isoserin, 38.
 — — chloro-, and some of its salts, 38.
 — — etherification of, 486.
 — — in the urine in disease, 1309.
 — — preparation of, 715, 827.
 Lactobutyrometer, 778.
 Lactone of carboxycornicularic acid, 1076.
 — of cornicularic acid, 1077.
 — of isocaproic acid, 34.
 — of isodihydrocornicularic acid, 1077.
 — of normal caproic acid, 33.
 Lactones, boiling points of, 947.
 — constitution of, 32.
 — from iso- and di-bromocaproic acid, 944.
 Lactose nitrates, 1043.
 Laëvo-malic acid, acetic derivative of, 830.
 Lævulan, 819.
 Lævulos, 819.

Lamps, incandescent, use of, for photographic purposes, 1240.
 Latent heats of evaporation of saturated alcohols, 355.
 Lauramide, 1273.
 Lauronitril, 1274.
Laurus camphora, examination of the leaves of, 989.
 Lautite, 474.
 Lavas of Monte Somma, 482.
 — and ashes ejected in the latest eruptions of Vesuvius (1868-1882), chemical composition of, 1177.
 Law of distribution, 456.
 — of smallest volumes, affinity values of fluorine with the metals as deduced from, 137.
 — of volumes for the liquid state, 1272.
 Lawrence's cooler, use of, in the creaming of milk, 1149.
 Lead chromate, behaviour of, in organic combustions, 898.
 — contamination and lead pipes, notes on, 668.
 — copper vanadate from Laurium, 472.
 — detection of, in potassium bromide, 99.
 — extraction of, 346.
 — iodide, action of potash on, 142.
 — — action of potassium carbonate on, 142.
 — — blue, 143.
 — — combination of, with alkaline iodides, 466.
 — iodine-compounds of, 142.
 — nitrate, action of metallic lead on aqueous solutions of, 364.
 — ores, detection of traces of silver in, 774.
 — — quantitative estimation of silver in, 1134.
 — oxide, action of, on the iodides of the alkali-metals, 695.
 — — action of potash on, 927.
 — pipes, action of cement on, 1335.
 — quick method for the estimation of, in tin, 99.
 — salts, decomposition of, by alkalis, 805.
 — volumetric estimation of, 776.
 — volumetric estimation of, by potassium permanganate, 897.
 Leather-meal, agricultural value of, 331.
 Leaves, absorptive and diffusive power of, 81.
 — green, electromotive action of the upper surface of, 638.
 — young, allantoin and asparagine in, 1195.

- Leclanché's battery, composition of the crystals deposited on the zincs in, 697.
 Lecture experiments, 137, 689, 690.
Lemna trisulca (duck-weed), composition of, 422.
 Lemon juice, changes which it undergoes, 435.
 Leucanisidine, 834.
 Leuccines, 1116.
 Leucines, 1116.
 Leukæmia, oxidation in the tissues in, 1309.
 Levulin in oak-bark, 158.
 Levulose, 158.
 Licarene, 737.
 Lichtenberg figures, explanation of, 448.
 Liebig's extract of meat and an imitation of it, analysis of, 248.
 Light, chemical action of, 129.
 — effect of, on transpiration in plants, 418.
 — electric current produced by, 352.
 — importance of, for the formation of haemoglobin, 751.
 — influence of, on the formation of red pigment, 641.
 — influence of, on the germination of grass-seeds, 882.
 — influence of, on the respiration of seeds during germination, 419.
 — that has passed through absorbing media, mean intensity of, 1.
 Lignified tissues, 1122.
 Lignin, nature of, 1123.
 "Lime mud," estimation of sugar in, 782.
 Limonite, artificial pseudomorph of, 576.
 Linnaeite, crystals of, found in the coal-beds of the Rhondda Valley, Glamorganshire, 282.
 Linaloës, essence of, 737.
 Linseed cake and its adulteration, 84, 549.
 Linseed meal, 549.
 Liquefaction and cold produced by the mutual action of solids, 450.
 Liqueurs, testing of, 561.
 Liquid, influence of the quantity of gas dissolved in a, on the surface tension of the latter, 1259.
 — carbon compounds, relation between the optical and thermal properties of, 263.
 — compounds, relation between the molecular refraction of, and their chemical composition, 1153.
 — — volume constitution of, 458, 1272.
 — inclosures found in native sulphur, 810.
 Liquid and gaseous states, 688.
 Liquids, critical temperature of, 915.
 — electrolytic diffusion of, 565.
 — polarisation of electrodes and conductivity of, 912.
 — specific viscosity of, 272.
 — specific volumes of, 1259.
 — various, electro optic experiments on, 678.
Liquor aluminii aceticici, preparation of, 943.
 Lithium, existence of, in notable quantities in the Dead Sea, 1037.
 — silicates, 278.
 — spectrum of, 254.
 Litter, peat as, 333.
 Liver, action of, on peptone, 540.
 — formation of sugar in, 540.
 — post-mortem formation of sugar in, 541.
 — urea in, 754.
 Lophine and allied compounds, constitution of, 1063.
 Loxopterygine, 744.
 Lupine alkaloids, 229.
 Lupine-sickness in sheep, 637.
 Lupines, cultivation of, 649.
 Lupinine, action of sodium on, 873.
 — hydrochloride, action of phosphoric anhydride on, 229.
 Lutein, 76.
 β -Lutidine, action of chlorine on, 311.
 — action of sodium on, 309.
 — hydrochloride and uranyl chloride, 310.
 — picrates, 311.
 — platinochloride, trichloro-, 311.
 — sulphate and uranyl sulphate, 311.
 — and silver nitrate, 310.
 Lutorcein, 729.
 Lutorcinol, an isomeride of orcinol, 729.

M.

- Macleyine, 1112.
 Magenta, detection of, in wines, 1006.
 — disappearing from coloured wines, possibility of, 347.
Magnesia alba, 13.
 — *carbonica ponderosa*, 14.
 — *usta*, 14.
 — *usta levigata*, 14.
 Magnesium acetate, basic, 825.
 — carbonates, 13.
 — chloride, anhydrous, synthesis by means of, 838.
 — estimation of, in urine by titration, 775.
 — formate, action of heat on, 1050.

- Magnesium oxychlorides, and heats of formation of, 696.
 — separation of, from calcium, iron, and alkalis, 97.
 — spectrum of, 254, 255.
 — sulphate, growth of crystals of, in presence of another salt, 574.
 Magnetisation, heat developed by, 1019.
 Maize, feeding horses with, 415.
 — germinating, presence of a vibriole in, and in the stalk of the plant, 1311.
 — method of freeing it from fat before using it for the manufacture of spirit, 348.
 — residues of distilleries, employment of, 672.
 Malates, optical activity of, at different temperatures, 911.
 Maleic acid, conversion of fumaric acid into, 389.
 — etherification of, 383.
 — from fumaric acid, 389.
 Malic acid, optical activity of, at different temperatures, 911.
 — presence of, in *Chelidonium majus*, 82.
 Malonamide, amido-, 947.
 Malonic acid, synopsis of the polybasic fatty acids obtained from, by Conrad's method, 1187.
 — chloro-, and its derivatives, 947.
 Malonylamide, chlor-, 39.
 Malonylanilide, anilido-, 39.
 Malting-barleys, analysis of, 672.
 Maltose, 818.
 — action of diastatic ferments on, 749.
 — specific rotation of, 707, 818.
 Man, pancreatic secretion of, 753.
 Mandelic acid, amide of, 56.
 — dextrorotatory, preparation of, from the optically inactive acid, 1076.
 Manganese, basic salts of, 1172.
 — dioxide, analysis of, 555, 895.
 — direct separation of, from iron, 97.
 — influence of, on the strength of iron, 781.
 — mineral, a new, 578.
 — nitrate, basic, preparation of, 1033.
 — nodules and their occurrence on the sea bottom, 369.
 — ores, preparatory treatment of, for the production of ferro-manganese and crude manganese in blast-furnace, 1144.
 — oxychloride, 1033.
 — presence of, on the surface of rocks, 1270.
 Manganese salts, basic, 1032.
 — tartronate, crystalline forms of, as given by Pantanelli, 1187.
 — and iron, separation of, 426.
 Manganous salts, action of ozone on, 1032.
 — and nickelous sulphates. Part I of researches on chemical equivalence, 689.
 Mannitol, 819.
 — oxidation of, by an alkaline solution of potassium permanganate, 157.
 Manure, estimation of soluble nitrogen in, 769.
 — from deep stalls, 992.
 — from sea-weed and marsh-weeds, 652.
 — meal, preparation of, 93.
 — phosphates, 770.
 — salts, Stassfurth, analysis of, 1229.
 Manures, 92.
 — animal, cultivation without, 1314.
 — artificial, effects of, on the physical condition of soils, 1227.
 — estimation of potassium in, 95.
 — gypsum, 1316.
 — phosphatic, on turnips, a report of experiments carried out in Scotland, in 1880, 653.
 — prepared with peat, 244.
 Manuring experiments at Grignon, in 1881, 1314.
 — — — at Königsberg, 1130.
 — — — at the experimental station at Göttingen, 89.
 — — — at the experimental stations of the Highland Agricultural Society, 767.
 — — — on barren sandy heath, 654.
 Manuring of fen lands with kainite, 771.
 — with potash salts, 770.
 — — — saltpetre, superphosphate, and precipitated phosphate, 1229.
 — — — sea mud, 770.
 — — — various phosphates, 653, 770.
 "Marc," influence of, on wine, 1014.
 Marl, analysis of, 551.
 Mass, influence of, on chemical action, 1261.
 — — — on the mutual substitution of halogens, 457.
 Meat, penetration of heat into, during cooking, 1152.
 — valuation of, 676.
 Meconic acid and its derivatives, 601.
 Mediterranean and other waters, colour of, 1017.
 Melanotekite, from Laangban, analysis of, 291.
 Melaphyres, examination of, 588.

- Mellic acid, obtained by the electrolysis of an alkaline solution with carbon electrodes, 850.
- Mellitogen, 406.
- Mellogen, 406, 850.
- Melting-points, 567.
- — — of easily fusible metals and alloys, apparatus for determination of, 914.
- Memecylon tinctorum*, analysis of the leaves of, 1124.
- Menthol, etherification of, 817.
- carbonate, 1213.
- Menthol-urethane, 1213.
- Mercaptan and hydrogen sulphide, crystalline compound formed in water containing, 592.
- Mercuric chloride, action of, on cast-iron, 660.
- — — action of sulphurous acid on, in presence of sodium chloride, 929.
- — — reactions of, 929.
- ethide, action of, on iodides, 409.
- iodide, reaction of, with sodium thiosulphate, 806.
- oxide, temperatures of formation and decomposition of, 18.
- Mercurous chloride, action of mercuric nitrate on, 18.
- — — molecular weight of, 466.
- — — chromates, 1029.
- Mercury, decomposition of the haloid salts of, by haloid acids, and by the haloid salts of potassium, 682.
- detection of, in animal substances, 99.
- double decomposition of haloid salts of, 1020.
- double salts of, and heats of formation of, 684.
- estimation of, 338.
- fulminate, action of various substances on, 816.
- paraxylyl, 187.
- sulphy-selenides, American, 148.
- and chromium, salts of, 293.
- Mercurytoly chloride, 732.
- Mesaconamide, 1281.
- Mesaconanilide, 1281.
- Mesaconic acid, 829.
- — — derivatives of, 1281.
- Mesidine derivatives, 955.
- nitro-, 1200.
- Mesitol, nitro-, 1200.
- Mesitonic acid and its derivatives, 941.
- Mesitylcarbimide, 956.
- Mesitylene, methylation of, 391.
- Mesitylenephthalic acid, 848.
- Mesityl ethyl carbonate, 956.
- Mesitylethylthioic acid, 956.
- Mesitylic acid and its derivatives, 941.
- Mesitylphthalamide, 956.
- Mesitylsuccinimide, 956.
- Mesitylthiocarbamide, 956.
- Mesitylthiocarbimide, 956.
- Mesolite from Etna, 284.
- Mesocinol, 1200.
- Mesozoic diabase, normal, on the Atlantic border, mineralogical composition of, 585.
- Metacopaïbic acid, commercial so-called, constituents of, 65.
- Metacresols, nitro-, 1198.
- — — nitroso-, 1198.
- Metahomo- β -metamethoxysalicyl-aldehyde, 55.
- Metahydroxybenzoic acid, etherification of, 487.
- Metahydroxypropylsulphobenzoic acid and its salts, 195.
- Meta-isocymene, 299.
- α - and β -bromo-, 618, 619.
- trinitro-, 301.
- α -Metaisocymenesulphonic acid, mono-brom-, and its lead salt, 300.
- Metaisocymenesulphonic acids and their salts, 300.
- α -Metaisocymenol, 300.
- Metal, influence of one, on the surface of another metal placed at a short distance, 921.
- Metaldehyde, 31.
- Metallic acetates, decomposition of, in presence of water, 388.
- — — formates, decomposition of, in presence of water, 494, 496.
- — — salts, relation between the isomorphism, atomic weights, and toxic effects of, 879.
- — — and oxides, action of ozone on, 1161.
- — — sulphides, insoluble; action of, on acid solutions of nickel sulphate in presence of hydrogen sulphide, 928.
- — — surfaces, decorating, by the aid of photography, 247.
- — — vapours, reversal of the lines of, 254.
- Metals, affinities of, for oxygen, as shown by the heat developed and the contraction produced during combination, 451.
- affinity value of the silicofluorides of, as deduced from the law of smallest volumes, 1024.
- certain, detection of, by means of the microscope, 245.
- chemico-electric relations of, in solutions of potassium salts, 261.
- easily fusible, apparatus for determination of the melting points of, 914.

- Metals, electrolytic separation of some, 896.
 — estimation and separation of, 97.
 — molecular structure of, 792.
 — of the iron group, double cyanides of, 154.
 — of the platinum group, oxidation of, 1033.
 — report on the processes of Claesson and Reis for the determination and separation of, by electrolysis, 1320.
 — volatilisation of, in a vacuum, 1264.
- Metaluteotungstic acid, 702.
- Metamethoxycoumarin, 53.
- Metamethoxysalicylaldehyde, 52, 55.
- Metamethoxysalicylic acid, 53.
- Metaphosphoric acid as a test for albumin, 110.
- Metaquinolinecarboxylic acid and its salts, 71.
- Metastyrolene, 210.
- Metasulphamine-benzoic acid, 1096.
- Metatoluenesulphonamide, oxidation of, 1095.
- Metatoluic acid and its derivatives, 185, 1283.
- Metatoluic acids, chloro- and bromo-, transformation of the amido-toluic acid into, 607.
- Metatoluidine, preparation of, 47.
- Metatoluquinoline and its salts, 1216.
- Metaxite from Reichenstein, chemical composition of, 481.
- Metaxylene, methylation of, 391.
 — nitro-, conduct of, towards oxidising agents, 607.
- Metaxylyl alcohol, 1284.
 — bromide, 1283.
- Metaxylylene bromide, 1283.
- Metazoxybenzophenol, 48.
- Metazoxybenzorthosulphonic acid and its salts, 48.
- Metazoxybenzoyl- β -naphthol and its salts, 49.
- Metazoxybenzoyl- β -naphthol- α -disulphonic acid, 49.
- Metazoxybenzoyl- β -naphtholsulphonic acid, 49.
- Metazoxybenzoyl-resorcinol, 49.
- Metazoxysulphobenzoyl- β -naphthol- α -disulphonic acid, 49.
- Meteoric iron from Lexington Co., S. Carolina, 153.
 — — — from Whitfield Co., Georgia, 153.
 — — — orientation of the cleavage planes in, by means of Widmannstadt's figures, 153.
- Meteorites, preliminary notice of new or but little known, 153.
 — synthesis of, 292.
- Meteorites, two Japanese, 814.
- Methacrylic acid, molecular refraction of, 827.
- Methane, dibromodinitro-, and its alkaline salts, 955.
- Methylenediphenylamidine, new method of preparing, 503.
- Methylenediphenyldiamine, 958.
- Methoxyquinoline and its salts, 412.
 — tetrahydride and its salts, 413.
- Methoxyquinone, 302.
- Methyl alcohol, action of chloride of lime on, 30.
 — — — solubility of anhydrous copper sulphate in, 1274.
 — allyl carbinol, 377.
 — citronate, molecular refraction of, 829.
- Methyl diethyl propenyltricarboxylate, 1191.
 — dipropylmethyl ketone, 600.
 — ethyl isopropyl carbinol, 37.
 — hemipinate, α -acid, products of the distillation of, with lime, 1207.
 — mesaconate, molecular refraction of, 829.
 — paranitrophenyl ketone, 847.
 — propylmetacresylate, 1199.
- Methylacetamide, 822.
- Methylacetylenecarboxylic acid, thiocarbamide of, 501.
- Methyl-alloxantsins, 1055.
- Methylamidobenzene, nitroso-, 189.
- Methylamidocarbimidooamidodinitrophenol, 969.
- Methylamine, method of preparing, 592.
- Methylamylpiperidine, 982.
- Methylamylpiperylammonium iodide, 982.
- Methylanthracene, 858.
- Methylarbutin, synthesis of, 174.
- Methylated spirit, examination of, 1002.
- Methylaurin, action of potash on, 1291.
 — bromination of, 1291.
 — hydrobromide of, 1291.
 — tetrabromo-, 1291.
 — sulphate, 1292.
- Methylbenzyl-piperidine, 982.
- Methylbenzylpiperylammonium iodide, 982.
- Methylbromotarconinic acid and its salts, 869, 870.
- Methylbromotarconium iodide, and the action of barium hydroxide on, 869, 870.
- Methylbutylbenzene, synthesis of, 952.
- Methyldiacetamide, 822.
- Methyldibromopyridylammonium hydroxide, and its derivatives, 316.
- Methyldiphenylamine, dinitro-, and its monobromo-derivative, 1057.

- Methyldiphenyldiamine, new method of preparing, 503.
- Methylene blue, dyeing with, 127.
— diphenyl oxide, 1212, 1302.
- Methylene-hexphenylphosphonium iodide, 1063.
- Methylerythrohydroxyanthraquinone, 1100.
- Methylerythroxyanthraquinone, 1099.
- Methylglyoxaline, 166, 821.
- Methylguaiacol, 54.
- Methylhydroxyglutaric acid, mono- and di-basic, and some of its salts, 34.
- Methyl-nandelic acid and its salts, 195.
- Methylnoropionic acid and monochloro-, 403.
- Methylorthonitrobenzene, nitroso-, and methylated, 188.
- Methyloxamic acid, 628.
- Methyloxanthranol, 861.
- Methylparabanic acid, 633.
- Methylparacoumaric acid, 731.
- Methylphenylamido-benzoic acid, 183.
- Methylphenylthiocarbizine, 1095.
- Methylpropylacetic acid, 711.
- Methylquinol glucoside, 175.
- Methylquinoline, 739.
- Methylsalicylic alcohol, 174.
- Methyltetrahydrocinchoninic acid and its derivatives, 532.
- Methyltropine, 216, 217.
— iodide, and platinochloride, 216.
- β -Methyltropine, 216.
- Methyltropineammonium, 216.
- Methoxydiphenylamine, 179.
- Mica, black, polychroic nuclei of, 811.
- Mica-schist, analysis of, 1177.
- Microcline, occurrence of, near Freistadt, in Upper Austria, 580.
- Microzymas of the gastric glands, and their digestive power, 1118.
— of the gastric juice, 752.
- Microzymin, 754.
- Mildew fungus, chemical composition of, 642.
- Milk, coagulation of, by rennet, 1149.
— composition, properties, and analysis of, 662.
— creaming, according to Becker's method, 674.
— diet, tissue change on, 749.
— effect of pulverised porcelain and of animal charcoal on, 759.
— estimation of fat in, by the lactobutyrometer and Soxhlet's aræometer, 109.
— estimation of salicylic acid in, 1003.
— ewe's, as influenced by fodder, 1309.
— ewe's and goat's, composition of, 541.
- Milk, examination of, 109, 661.
— feeding with, 636.
— free fatty acids in, 987.
— human, 758.
— is it warmed by passing through the centrifugal machine? 1016.
— of wet nurses, composition of, 986.
— preservation of, 1148.
— production, influence of different oil cakes on, 321.
— rropy, 1122.
— Scherff's process for preserving, 1016.
— skim-, aræometric estimation of fat in, 1138.
— use of Lawrence's cooler in the creaming of, 1149.
- Milk-casein, change of, 1147.
- Milk-sugar, anhydrous, 157.
— — — crude and refined, preparation of, 1014.
— — — ethereal nitrates from, 1042.
- Milk and butter, 899.
- Milk-tester, a new, 559.
- Mimetesite from Laangban, 283.
- Mineral in the Courl Mine in Westphalia, occurrence of, 20.
- acids, complex, derived from tungstic acid, constitution of, 368.
- analysis, 286.
- species, new, existence of, in gneiss, from Beaunant, near Lyons, 151.
- water from Amherst, British Burmah, 706.
- — — of Barèges, composition of, 293.
— — — of Schinznach, 932.
— — — of Oberbrunnen, at Salzbrunn in Silesia, analysis of, 1178.
— well at St. Anna, near Cernowic, analysis of, 371.
- Minerals, action of sulphurous acid on some, 583.
- action of the electromagnet on, and its use for their mechanical separation, 656, 810.
- blue, from Champonost (near Lyons) and Chili, 151.
- contained in the pegmatite veins of Moos, 579.
- from Albergaria Velha, in Portugal, 473.
— — — Chili, 471.
— — — Etna, 284.
— — — Laangban, analyses of, 291.
— — — Italian, 479.
— mechanical separation of, 1173.
— new, substances which may prove to be, 288.

- Minerals of North Carolina, 147.
 — of the cryolite group, chemical composition of, 1176.
 — thermal conductivity of, 790.
- Mirrors, decorating, by the aid of photography, 247.
- Molasses, method of obtaining sugar from, 1146.
 — occurrence of α -hydroxyglutaric acid in, 1190.
 — preparation of sugar from, 122.
 — recovery of sugar from, 784.
 — sugar-house, detection of starch-sugar syrup mixed with, 429.
 — waste, conversion of, into gas, 787.
 — — — preservation of, 651.
- Molecular grouping in organic bodies, influence of, on their absorption in the infra-red region of the spectrum, 130.
 — refraction of liquid carbon compounds, 909.
 — — — of liquid carbon compounds, dependent on their chemical constitution, 910.
 — — — of liquid compounds and their chemical composition, relation between, 1153.
 — — — and chemical constitution, relation between, 351.
 — — volume of solids, 275.
 — — volume, relation of, to atomic combination, 1024.
 — — weight of homologous bodies, influence of, on the course of incomplete reactions, 384.
- Molecule, separation of water within the, 1045.
- Molybdenum dioxide, 702.
 — — fluorides, 1171.
- Molybdic acid, volumetric estimation of, 555.
- Monalkyl compounds, 505.
- Monamylanhydrobenzodiamidobenzene iodide, 505.
- Monanisylcarbamide, 302.
- Monazite from Amelia Co., Virginia, 1175.
- Monethylquinonehydodicarboxylate, 714.
- Monethylanhyclacetdiamidotoluene iodide, 505.
- Monobenzoparamidophenol, 505.
- Monobenzoyldiphenyl, 62.
- Monobenzylidene acetone, 513.
- Monobenzylthymol and its acetyl-derivative, 171.
- Monochromatic light, spectroscopic observations with, 677.
- Monofurfurylidene acetone, 513.
- Monomethylalloxan, 629, 633.
- Monomethyl-alloxantin, 1056.
- Monomethylanisidine, 302.
- Monomethylcarbamide, 628.
- Monomethylorcinol, 52.
 — dibromo-, 52.
- Monomethylparabanic acid, 628.
- Monomethylquinol, 52.
- Mononaphthylamine, 179.
- Monophenylboric acid and its salts, 731.
 — chloride and some of its derivatives, 731.
- Monophenyldimethylarsine, 305.
- Monoxylamide, 950.
- Monte Somma, studies on, 482.
- Morphine, a new series of bases derived from, 218.
 — complex character of, transformation into picric acid, and its solubility, 413.
 — distillation of, with zinc-dust, 530, 1112.
 — fate of, in the animal body, 543.
 — influence of, on the formation of herapatite, 1005.
 — new colour reactions of, 340.
 — oxidation-products of, 73.
 — transformation of, into codeine, 981.
- Mucates of aromatic amines, dry distillation of, 178.
- Mucic acid, 498.
- Mucin of *Helix pomatia*, and a new carbohydrate (achrooglycogen) from the same, 708.
- Mud, analysis of, 550.
- Mulberry-trees, occurrence of succinic acid in an incrustation on the bark of, 602.
- Muscle, amount of lactic acid in, 539.
 — carbonic acid of, 539.
 — influence of tetanus on the acids contained in, 539.
- Must, analysis of, 1000.
 — — — clarification of, 347, 1145.
 — — — preservation of, by means of salicylic acid, 1010.
 — — — unfermented, condensation of, in a vacuum, 672.
- Mustard, analysis of, 1007.
- Myosin, its preparation, properties, conversion into syntoinin, and regeneration from the same, 745.
- Myristamide, 1274.
- Myristonitril, 1274.
- Myronic acid, distribution of, in the seed of *Brassica Napus* and *B. Rapa*, 243.
 — — — testing oil-cakes for, 1236.

N.

Naphthalene, action of bromine on, 203.
 —— action of hydrogen dioxide on, 502.
 —— action of iodine on, at high temperatures, 733.
 —— α -bromo-, oxidation of, 63.
 —— constitution of, 1196.
 —— derivatives, 734, 1212.
 —— —— constitution of, 62.
 —— oxidation of, 63.
 —— purification of, 202.
 —— dichloro-, 736.
 —— δ - and ϵ -dichloro-, derivatives of, 409.
 —— dichloro-, from β -naphtholsulphonic acid, 734.
 —— α - and β -dinitro-, oxidation of, 63.
 —— monobromonitro-, 735.
 —— α -nitro-, oxidation of, 63.
 —— pentachloro-, oxidation of, 1210.
 α - and β -Naphthalenesulphonic acid, oxidation of, 63.
 Naphthalenetetrasulphonic acid and its salts, 624.
Naphthalenes, amido-, conversion of α - and β -naphthols into, 972.
 —— bromo-, 734.
 —— dibromo-, 203.
Naphthaquinone, 737.
 —— compounds of, with toluidine and ethylaniline, 853.
 —— dichloro-, action of amines on, 973.
 —— trichloro-, 1211.
 α -Naphthaquinone, preparation of, 203.
 β -Naphthaquinone and some of its derivatives, formation and constitution of, 521.
 —— constitution of, 204.
 β -Naphthaquinoneanilide, 522.
 —— and ethereal derivatives of, 735.
 α -Naphthaquinoneanilide and its derivatives, 204.
 Naphthaquinoneanilide, chloro-, and its derivatives, 973.
 β -Naphthaquinoneanilide and its derivatives, 967.
 Naphthaquinonenitrilanilides, chloro-, 973.
 Naphthaquinoneparabromanilide, chloro-, 973.
 β -Naphthaquinoneparatoluide and its salts, 522, 736.
 β -Naphthaquinoneethylylanilide, 854.
 α - and β -Naphthaquinonetoluide, 854.
 Naphthaquinonetoluides and their derivatives, 974.
 Naphthoic acid, mononitro-, 1212.

Naphthol, chloro-, from β -naphtholsulphonic acid, 734.
 α -Naphthol, monochloro-, 736.
 β -Naphthol, a diatomic alcohol derived from, 735.
 —— action of chloroform on, 1068, 1211.
 —— amido-, preparation of, 522.
 —— glycol obtained by the action of chloroform on, 1299.
 Naphthol ethers, 1212.
 β -Naphtholazohippuric acid, 50.
 Naphthols, α - and β -, conversion of, into amidonaphthalenes, 972.
 —— preparation of colouring matters by the action of diazo-anisoils on, 124.
 α -Naphtholsulphonic acid, action of phosphorus pentachloride on, 736.
 Naphthosulphonic acid, diamido-, 64.
 β -Naphtholsulphonic acid, dichloronaphthalene and chloronaphthol from, 734.
 Naphthosulphonic acid, diimido-, 64.
 —— —— nitroamido-, 64.
 α - and β -Naphtholsulphonic acids, comparison of, 734.
 Naphthosulphonic acids, preparation of colouring matters by the action of diazo-anisoils on, 124.
 —— —— dinitro-, 63.
 α -Naphtholsulphonyl chloride, 736.
 β -Naphthoxyaldehyde and its derivatives, 1068.
 Naphthoxy-carboxylic acid and its salts, 1068.
 Naphthylacrylic acid, synthesis of, 205.
 Naphthylamine, action of hydrogen dioxide on, 502.
 Naphthysuccinimide and its nitro-derivative, 181.
 Naphthylsulphuric acid, 736.
 Nartie acid, 873.
 Nartine, 870, 872.
 Natrolite from Etna, 284.
 Natural waters, comparison of the oxygen with the organic matters in, 556.
 —— —— proportion of potash to soda in, 372.
 Neocyan, 370.
 Nephrite from pile dwellings, analyses of, 931.
 Neurostearic acid, 537.
 Neutral fat, estimation of, in mixtures of fatty acids, 1236.
 —— fats, estimation of, in palm oils and autoclaved materials, 342.
 Nevrine, new base analogous to, 1303.
 Nickel, detection of, 555.
 —— hydrosulphide of, 1032.

- Nickel chloride, action of hydrogen sulphide on, 1172.
 —— sulphate solution, action of hydrogen sulphide on, 805.
 —— action of insoluble metallic sulphides on acid solutions of, in presence of hydrogen sulphide, 928.
 —— ammoniacal, action of hydrogen dioxide on, 1262.
 —— and cadmium sulphates. Part II of researches on chemical equivalence, 689.
 —— and cobalt, separation of, 1234.
 —— use of bromine in the analysis of, 99.
 —— and other metals of the same group, action of hydrogen sulphide on saline solutions of, 1031.
 —— cobalt, and copper, colour relations of, 1.
 Nickeliferous iron of Santa Catarina in Brazil, magnetism of, 369.
 Nickelous and manganous sulphates. Part I of researches on chemical equivalence, 689.
 Nicotinic acid, 311.
 —— from pyridine, 627.
 Nicotine bromides, 1216.
 —— estimation of, in tobacco, 108, 1005.
 —— presence of, in tobacco smoke, 906, 1253.
 —— specific gravity of, and of its aqueous solutions, 216.
 Nitranilines, action of phenylthiocarbimide on, 183.
 Nitrate plants, 769.
 Nitrates, decomposition of, during vegetation in the dark, 327.
 —— in potable waters, tests for, 556.
 Nitre, manufacture of, from the salts of osmose waters, 1012.
 Nitric acid, combination of, with ammonia, 1162.
 —— estimation of, 361.
 —— separation of, from the living organism, 100.
 —— ferment, alterations in the properties of, by cultivation, 79, 1223.
 —— oxide, absorbents for, 1230.
 —— action of sulphurous anhydride on, in presence or absence of oxygen, 139.
 —— as a supporter of combustion, 264.
 —— decomposition of, by heat, 1317.
 —— estimation of, in the exit gases of acid chambers, 774.
 —— explosion of, 454.
 —— preparation of, 692.
- Nitric acid and peroxide, estimation of, as ammonia, 773.
 Nitric peroxide, and nitric oxide, estimation of, as ammonia, 773.
 Nitril, diimido-, 165.
 Nitrils of the higher members of the acetic acid series, 1273.
 Nitrates, new and expeditious method for the estimation of, under different circumstances, 1317.
 Nitro-acids derived from ketones, 710.
 Nitrogen compounds, action of stannous chloride on, 361.
 —— elimination of, from tyrosine, 730.
 —— evolution of, during putrefaction, 991, 1122.
 —— gaseous, elimination of, from the animal body, 238, 636, 747.
 —— nitric, estimation of, 1317.
 —— organic, conversion of, into ammonia, 1316.
 —— peroxide, behaviour of, in the manufacture of sulphuric acid, 1162.
 —— process, Williams's, 100.
 —— recovery of, from molasses waste, 669.
 —— refraction-equivalents of, in organic compounds, 133.
 —— retrograde, 769.
 —— the combination in which it is most available for plants, 769.
 —— sulphide, 460.
 —— tetroxide, absorption-spectrum of, 1017.
 —— —— behaviour of, with sulphuric acid, 1010.
 —— —— specific heat of, 1019.
 Nitrogenous constituents of urine, estimation of, 1330.
 Nitrometer, Lunge's, analysis of salt-petre by the aid of, 774.
 Nitrophenols, two new, 51.
 Nitro-products of the fatty series, constitution of, 935.
 Nitroso-compounds and ketines, 940.
 Nitrous acid, detection of, in the blood, 1231.
 —— —— separation of, from the living organism, 100.
 —— anhydride, existence of, in the state of vapour, 926.
 —— oxide, decomposition of, by heat, 1317.
 —— —— density of, 362.
 —— —— estimation of, 244, 362, 1132.
 Nitryltropeïne, 984.
 Nomenclature of carbonic acid derivatives, suggestions respecting, 381.
 —— complicated azo-compounds, 1061.
 Non-albuminous nitrogenous matter in plants, quantitative estimation of, 901.

Nonylamine, 1054.

Nonyldecoxy carbamide, 1053.

O.

Oak-bark, levulin in, 158.

Oats, development of, 418.

— examination of, 647.

— manured with steam and dissolved bones, 333.

Oberbrunnen springs at Salzbrunn in Silesia, analysis of, 1178.

Octine, 1179.

Octoic acids, 600.

Octyl alcohol, heat of combustion of, 567.

Octylamine, 1054.

Oetyl nonoxyl carbamide, 1053.

Œnanthamidoacetic sulphite, 304.

Œnanthamido benzoic acid, 304.

— sulphite, 304.

Œnanthamido caproic sulphite, 305.

Œnogalic acid, estimation of, in wines, 780.

Œnolin, estimation of, in wine, 430, 1137.

Œnotannin, estimation of, in wine, 430, 1137.

Oil of Anda-Assu, 435.

— *Erigeron canadense*, 64.

— peppermint, reaction of, 667.

— wild thyme, 524.

Oil-cakes, different, influence of, on milk production, 321.

— digestibility of some, 86, 647.

— testing of, for myronic acid, 1236.

Oil-seeds, albuminoins in, 234.

Oils, ethereal, 120.

— hydrocarbon and fat, separation of, 108.

Olefines, relative proportions of, in shale and petroleum products, 100.

Oleic acid, estimation of, in palm oils and autoclaved materials, 342.

— — purified, preparation of, 123.

— soap, 1016.

Oleomargarin, detection of, 341.

Olive, wax and buttery substances from the epicarp of, 765.

Olive-oil, test for distinguishing cotton-seed oil from, 662.

Omphalocarpin, 308.

Omphalocarpum procera, fruit of, 307.

Onofrite from Utah, analyses of, 148.

Opianic acid and its derivatives, 402, 1206.

— monochlor-, and its salts, 403.

— nitro-, and its salts, 402.

Opium assay, 666.

VQL. XLII.

Orcacetin, 1288.

Orcacetophenone, 1289.

Orcinaurin, 1201.

Orcinol, action of sulphuric acid on, 1290.

— constitution of, 51.

— new isomeride of, 728, 729.

Orcinoldiazotoluene, 1285.

Orcinyl diacetate, 1289.

— monacetate, 1289.

Organic acids, estimation of the chemical value of the constituents of, 595.

— — halogenised and hydroxylised, 492, 598.

— — synthesis of, by the electrolysis of water by means of carbon electrodes, 58.

— bases, compounds of bismuth iodide with, 528.

— bodies, various, oxidation of, in alkaline solution at the body temperature, 1307.

— forms, elementary, artificial production of, 356.

— matter in potable water, estimation of, 1324.

— residues, different, comparison of the combining energies of the halogens and of sodium with, 934.

— substances, influence of the structure of, on their refractive power, 349.

Organo-zinc compounds, action of, on the bromides of α -monobrominated acids of saturated series, 36.

Orpiment, occurrence of, in Utah, 148.

Orthanisidine-derivatives, 1287.

Orthite, from Amelia Co., Virginia, 1175.

Orthoanisidine and its derivatives, 302.

Orthobenzoylbenzoic acid, combination of, with hydrocarbons, 184.

— — compounds of, with phenols, 184.

Orthoclase, artificial, produced in the wet way, 478.

— decomposition of, 650.

Orthodinitro-compounds, 953.

Orthohomoparahydroxybenzoic acid, 607.

Orthonitraniline, action of anhydrous oxalic acid on, 180.

Orthoquinolinecarboxylic acid and its salts, 72.

Orthotoluidine, dimetanitro-, 1203.

Orthotoluylacetie acid and its salts, 1284.

Orthotolylguanidine, 191.

Orthotolylhydrazine and its salts, 1062.

Orthotolyl- α - and β -naphthylthiocarbamide, and its decomposition by hydrochloric acid, 1212, 1213.

Orthoxylene, preparation of, from toluene, 391.
 Orthoxylyl bromide, 1284.
 Orthoxylylene bromide, 1284.
 Osiers, cultivation of, 888.
Osmorrhiza longistylis, analysis of, 988.
 Osmose water, manufacture of nitre from the salts of, 1012.
 —— manuring with, 993.
 —— potassium chloride in, 115.
 Osmyl-ditetramine and its salts, 144.
 Osteelite as a manure, 92.
 Ostrich egg, an ancient, 242.
 Oxalates, conversion of, into carbonates, 1050.
 Oxaldinitraniline, 180.
 Oxalic acid and its sodium salt, action of electrolytic hydrogen on, 1185.
 —— decomposition of, by the action of aqua regia, 715.
 —— influence of heat and the proportion of glycerol on the decomposition of, 389.
 —— synthesis of, 1049.
 —— and tannin, Neubauer's relation between the reducing action of, 1238.
 Oxaline, 821.
 Oxalmethylene, 821.
 Oxalorthonitranilide, 181.
 Oxalylpiperidine, 983.
 Oxanthrano, its preparation and derivatives, 860.
 Oxethylaldehydine platinochloride, 1303.
 Oxethyl- α -collidine platinochloride, 1303.
 Oxethyl-quinoline hydrochloride, 1303.
 Oxides, hydration of, 12.
 Oxindol chloride, paradiazonitroso-, 188.
 Oxoetenol, 936.
 Oxoetenyl-acetate, 937.
 Octoyleic acid and its salts, 937.
 Oxyapocinchene, 225.
 Oxyazobenzene and some of its derivatives, 726.
 —— conversion of azoxybenzene into, 394.
 Oxycamphoric anhydride, 66.
 Oxycarbostyryl, 201.
 α - and β -Oxydinaphthylene, 623.
 Oxydiphenyl ketone, 618.
 Oxygen, absorption of, by alkaline solutions of pyrogallol and phloroglucol, 401.
 —— by metallic copper, 551.
 —— by platinum, 1023.
 —— active, 691, 795.
 —— new method for detecting the evolution of, by vegetable or animal organisms, 335.

Oxygen, refraction-equivalents of, in organic compounds, 133.
 —— variations of the amount of, in the atmosphere, 278.
 —— and carbonic oxide, temperature of combustion of a mixture of, 453.
 —— and hydrogen, combination of, by the electric discharge, 360.
 —— —— temperature of combustion of a mixture of, 453.
 Oxyhepta-isobutylidenamine, action of heat on, 164.
 Oxyisocamphor, 66.
 Oxylupinine, 873.
 Oxymethylene, 1277.
 —— new method for obtaining, 824.
 Oxymorphine hydrate, 73.
 Oxypropylmalonic acid, its salts and lactone, 948.
 Oxypropyltoluidine, 723.
 Oxyquinolines, preparation of, 441.
 Oxsacchulmic acid, 1182.
 Oxsacchulmide, di- and tri-chlor-, 1182, 1183.
 —— sesquibrom-, 1182.
 Ozone, absorption-spectrum of, 1017.
 —— action of, on manganous salts, 1032.
 —— on metallic salts and oxides, 1161.
 —— liquefaction of, 923.
 —— oxidation by, 797.
 —— retrogradation produced by the electric discharge during the conversion of oxygen into, 688.
 —— thermochemistry of, 915.
 —— transformation of, into oxygen by heat, 690.

P.

Pachnolite, composition of, 1176.
 Painting on glass, new method of, 127.
 Paints, preparation of, 444.
 Palau Islands, petrography of, 1034.
 Palladio-ditetramine, action of potassium osmate on the chloride of, 146.
 Palladium compounds, heat of formation of, 1258.
 Palladium metastannate, 809.
 Palm-oils, estimation of neutral fats and palmitic and oleic acids in, 342.
 Palmitamide, 1274.
 Palmitic acid, estimation of, in palm-oils and autoclaved materials, 342.
 Palmitonitrile, 1274.
 Pancreatic digestion, 1118.
 —— secretion, researches on, 753.
 Papaveraceæ, alkaloids of, 1112.

- Papayotin, 1118.
 — effect of the introduction of, into the animal system, 1309.
- Paper, cause of the acid reaction exhibited by some kinds of, 1339.
- Parabenzylidiphenyl, 202.
- Parabuxine, 745.
- Paracholesterin, formula of, 730.
 — from *Ethalium septicum*, 303.
- Paracinnamic sulphochloride, 1204.
 — sulphonamide, 1204.
- Paraconine, 215.
- Paracoumaric acid, preparation of, from paranitrocinnamic acid, 201.
- Paracresolphthalein, 1099.
- Paracresolphthalein anhydride and its derivatives, 1098.
 — — condensation-products of, by concentrated sulphuric acid, 1099.
 — — products of the decomposition of, by fusion with potash, 1099.
- Paracresolphthalin anhydride, 1098.
- Paradiazophenol hydrobromide, 397.
 — hydrochloride and its salts, 396.
 — nitrate, 396.
- Paraditolylamine, derivatives of, 1060.
 — mono- and di-nitro-, 1060.
- Paraditolylcarbamide, 507.
- Paraffin, crystallised, in geodes in a basaltic lava, 810.
 — derivatives, monohaloid, and addition-products of quinoline, behaviour of, with silver oxide, 980.
 — series, action of electrolytic hydrogen on bibasic acids of, 1185.
 — — combination of mono- and dibasic acids of, with phenols, 1201.
 — — preparation of amides of monobasic acids of, 950.
- Paraffins, normal, 1271, 1272.
- Paraglobulin, preparation of, 75.
- Paraglycocholic acid, 1220.
- Parahydroxybenzoic acid, 1291.
 — — two anhydrides of, 1293.
- Parahydroxymetatoluic acid, derivatives of, 1205.
- Parahydroxyphenylacetic acid from human urine, 514.
- Paramethoxymandelic acid and its amide, 57.
- Paramethoxyphenylamidoacetic acid, 57.
- Paramethylbenzyloxyphenylacetic acid, 403.
- Paramylan, 1044.
- Paraphenylbenzophenone, 202.
- Parapropylbenzoic acid, synthesis of, 840.
- Parquinolinecarboxylic acid and its salts, 72.
- Parasites, plant, researches on, 888.
- Parasulphamine-cinnamic acid, 1204.
- Paratoluic acid and diamides, tolylenediamine, and xylenamine, 504.
- Paratolylcarboxylic acid and some of its salts, 194.
- Paratolylacetic acid and its salts, 1283.
- Paratolylbenzyltolyleneamidine, 1061.
- Paratolylboric chloride, 732.
- Paratolylglycine, preparation of, 519.
- Paratolylimidoglycollic acid and its copper and silver salts, 519.
- Paratolyl- β -naphthylamine, 179.
- Paratolyl- α - and β -naphthylthiocarbamide and its decomposition by hydrochloric acid, 1213.
- Paratolylxylide and its nitro-compound, 504.
- Paraxylenol and its derivatives, 837.
- Paraxylenolcarboxylic acid, 837.
- Paraxylenols, nitro-, three isomeric, and their salts, 837.
- Paraxylene bromide, 1283.
- Paraxylol bromide, 1283.
- Parazotoluene- α -thymosulphonic acid, 834.
- Parvoline, 414.
- Pathological bases, 741.
- Patina, formation of, 670, 1334.
- Peanut-meal, fodder experiments on milch cows with, 321.
- Peas, comparison of the digestibility of, by horses and sheep, 415.
- Peat, and manures prepared with it, 244.
 — as litter, 333.
 — composition and use of, 769.
- Peat-moss from Bad Steben, near Hof, 644.
- Pectose, certain properties of, 420.
- Pegmatite veins of Moos and the minerals contained in them, 579.
- Pentamethyl alcohol hydrate and its derivatives, 37.
- Pentane, dinitro-, 824.
- Pentathionic acid, non-existence of, 1262.
- Pentylamine, normal, 1054.
- Pepsin, 752, 1118, 1220.
 — insoluble modification of, 877.
- Peptone, 536.
 — action of the liver on, 540.
 — in the blood, 78.
- Peptide-forming ferment in plants, 880.
- Peptides, 876.
 — hydration processes occurring during the formation of, from albumin, 238.
 — influence of, on the diastatic action of saliva, 1117.
 — presence of, in plants, 318.
- Peridote, artificial production of, in presence of steam at the ordinary atmospheric pressure, 286.

- Pernitric acid, 800, 927.
 — anhydride, absorption-spectrum of, 1017.
 Persio, detection of, in wines, 1006.
 Perthiocyanic acid, conversion of, into potassium thiocyanate, 1274.
 Peru balsam, adulteration of, 112.
 Petrography of the Philippine and Palau Islands, 1034.
 Petroleum, flashing point of, 1326.
 — from Caucasus, researches on, 390.
 — and shale products, relative proportions of olefines in, 100.
 Petroleum, American and Caucasian, decomposition of hydrocarbons of, at low temperature, 374.
 Phenacetin, 1288.
 Phenanthroline and its derivatives, 1111.
 Phenetoil, paranitro-, 396, 953.
 Phenol acids, etherification of, 487.
 — benzoate, derivatives of, 506.
 — amidocarbimidamidodinitro-, 969.
 — diazodibromo-, 398.
 — direct production of, from benzene, 395.
 — electrolysis of, 407.
 — estimation of, in surgical dressings, 106.
 — estimation of, in urine, 106.
 — ethers, paranitro-, preparation of, 396.
 — ethoxycarbimidamidodinitro-, 969.
 — formation of, in the intestines of herbivora, 240.
 — hydrate, 611.
 — paramido-, conversion of, into tri- and tetra-chloroquinone and trichloroquinonechlorimide, 611.
 — paramidodibromo-, 398.
 — para-, and ortho-diazodibromo-, and their derivatives, 397.
 — trichlorodimethylaniline amido-, 401.
 — new method of estimating, 778.
 — obtained by the action of zinc chloride on bromocamphor, 739.
 — quantitative estimation of, 339.
 — testing urine for, by the pine-wood reaction, 245.
 — methylamidocarbimidamidodinitro-, 969.
 Phenoldisulphonic acid, amido-, and its derivatives, 1075.
 Phenoguanidine, dinitro-, 969.
 Phenomethylguanidine, dinitro-, 969.
 Phenolorthosulphonic acid, 407.
 Phenoloxalic acid, 47.
 Phenolphthalein anhydride, 1096.
 Phenolphthalin anhydride, 1096.
- Phenolsulphonic acid, paradiazodibromo-, salts of, 398.
 — — — trichlorodimethylaniline amido-, 401.
 Phenols, action of ethylacetacetate on, in presence of dehydrating agents, 1289.
 — action of phosphorus oxychloride on, 839.
 — anhydro-compounds of, 505.
 — homologous synthesis of, 727.
 — nitro-, two new, 51.
 — production of colouring matters by the action of aromatic nitro-substitution-products on, 784.
 — simple method for the preparation of the ethereal salts of, 1288.
 — synthesis of, 171.
 — and acetic acid, condensation-products of, 1288.
 Phenoxyacetic acid, orthonitro-, behaviour of, with reducing agents, 849.
 Phenyl benzoate, preparation of, 1289.
 — succinimides, ortho- and para-, 181.
 — sulphide, preparation of, 1285.
 — thiocarbamate, and its ethyl and methyl salts, 298.
 Phenylacetic acid and its derivatives, 1070.
 — — — paranitro-, preparation of, 188.
 — — — derivatives, dinitro-, 188.
 Phenylacetopine hydrochloride, 984.
 Phenylacetylene and its derivatives, synthesis by means of, 622, 972.
 — orthamido-, and its derivatives, 623, 844.
 — orthonitro-, and ethyl acetacetate, action of potassium ferricyanide on the copper compounds of, 972.
 — paranitro-, 847.
 — para- and ortho- nitro-, 842, 843, 844.
 Phenylacrylic acid, isomeric monobromo-, behaviour of, with concentrated sulphuric acid, 615.
 Phenylamidoacetamide, 56.
 Phenylamidoacetic acid and its salts, 56.
 Phenylamidoacetonitril, 56.
 Phenylamidodiglycollic acid, 519.
 Phenyl- α -amidopropionic acid, 971.
 Phenylamidopropionic acid, occurrence of, amongst the products of decomposition of albuminoid bodies, 189.
 Phenylamine, dibromo-, 1060.
 Phenylaniline, α -dinitro-, 492.
 Phenylboric oxide, 732.
 Phenylbromacetonitril, 170.
 Phenylbutyrolactone, 1074.

- Phenylcarbaminethioic acid, 723.
 —— ethylene salt of, 723.
- Phenyl- β -chloropropionic acid, 191.
- Phenylcystine, 1282.
 —— bromo-, 757, 758.
- Phenyldibromopropionic acid, paranitro-, and some of its salts, 846.
- Phenyl- α - β -dichloropropionic acid, 191.
- Phenyldichloropropionic acid, action of alcoholic potash on, 1073.
- Phenyldithiocarbamic acid, ethyl and amyl salts of, 1089.
 —— methyl and ethylene salts of, 723.
- Phenyldithiurethane, 967.
- Phenylenecarbamide, 182.
- Phenylenediamine, action of ethyl chloracetate on, 957.
- Phenylenediaminenaphthaquinone, 205.
- Phenylethylcarbamide chloride, action of diphenylamine on, 183.
- Phenyllavaniline and its salts, 1067.
- Phenylglycidic acid, paranitro-, 191.
- Phenylglycine, 519.
- Phenylglycolylpiperpropylalkeine, 1193.
- Phenylglyoxylic acid, 196.
- Phenylhydrazine, thiocarbamides of, 1091.
- Phenylhydroxybutyric acid, 1074.
- Phenylimidobenzylphenylcarbaminthiethyl, and hydrochloride of, 967.
- Phenylimidoethylphenylcarbaminthiethyl, and hydriodide of, 966.
- Phenylimidoasatin, 304.
- Phenylimidophenylcarbamic acid, action of sulphuric acid on the alkyl salts of, 723.
- Phenylimidophenylcarbaminthiethyl, 966.
- Phenylisocrotonic acid, acid obtained in the preparation of, 190.
- Phenyllactic acid, 58.
- Phenylmandelic acid and its salts, 196.
- Phenylmercaptan, bromo-, 757.
- Phenylmercapturic acid, bromo-, 757, 1282.
- Phenyl- β -naphthylamine, 179.
- Phenyl- α - and β -naphthylthiocarbamide, decomposition of, by hydrochloric acid, 1212, 1213.
- Phenylorthotolylthiocarbamide, decomposition of, by hydrochloric acid, 1213.
- Phenylparatolylamine, 179.
- Phenylphenol ether, bromo-, 398.
- Phenyl-phenylenediamine, dinitro-, 1057.
- Phenylpropionic acid, orthonitro-, action of reducing agents on, 1100.
- Phenylpropionic acid, paranitro-, and its salts, 847.
 —— —— dibromide of, 847.
- Phenylpropionic acid, α -tribromo-, decomposition of, 730.
- Phenylpropylglycolic acid, 515.
- Phenylpropylketone, preparation of, 612.
- Phenylpyrogallophthalein and its acetyl-derivative, 184.
- Phenylquinoline, 979.
- Phenylresorcinphthalein and its derivatives, 184.
 —— anhydride and its acetyl-derivative, 184.
- Phenylsarcosine, 50.
- Phenylthiobenzenesulphonate, measurement of the crystals of, 832.
- Phenylthiocarbamide, 723.
 —— action of guanidine carbonate on, in presence of water, 395.
- compounds of, with acid amides, 394.
- Phenylthiocarbimidoglycolide, 298.
- Phenylthiocarbizine and its derivatives, 1094.
- Phenylthiohydantoïn, synthesis of, 407.
- Phenylthiosemicarbazide, 1093.
- Phenyltolylenediamine, dinitro-, 1057.
- Phenyltolylphthalide, 185.
- Phenyltribromopropionic acid, decomposition of, 730.
- Phenylvinyl ethyl oxide, 191.
- Phenylxanthamide, paranitro-, 955.
- Philadelphite, a new mineral species, 152.
- Philippine Islands, petrography of, 1034.
- Phloroglucol, absorption of oxygen by an alkaline solution of, 401.
- Phlorone, 612.
- Phonolite, 587.
- Phorone from glycerol, 613.
 —— oxidation of, 943.
- Phosphate, precipitated, manuring with, 1229.
- Phosphates for manure, 770.
 —— in soil, solubility of, by acids contained in the roots of plants, 334.
 —— manuring with, 770.
 —— —— in the Département du Nord, 1228.
- natural, manurial effects of, 993.
- neutral to litmus, 693.
- reverted, estimation of, 1319.
- soluble and insoluble, Aberdeen-shire experiments on the relative value of, 653.
- — — — — action of, on swedes, 1228.

- Phosphates, soluble and insoluble, manuring experiments with, 1315.
 —— relative value of, 90.
 —— various, application of, as manure for swedes, 91.
 —— deportment of, in the soil, 550.
 Phosphenyl chlorides, homologues of, 958.
 Phosphomellogen, 852.
 Phosphomolybdates and their analyses, 702.
 Phosphonium compounds, constitution of, 305.
 —— iodide, new combinations of aldehydes with, 710.
 Phosphorescence, 1263.
 —— in plants, new instances of, 422.
 Phosphorescent spectra, discontinuous, observed in an almost perfect vacuum, 445.
 Phosphoric acid, action of, on the sodium salts of tungstic acid, 702.
 —— agricultural value of various forms of, 1228.
 —— estimation of, 94, 553, 895, 1231, 1318.
 —— estimation of, by the molybdic method, 1318.
 —— estimation of, in the ashes of plants, 553.
 —— high percentage of, in volcanic soils, 550.
 —— in Peruvian guano, 1316.
 —— in the soil, 86.
 —— in the urine of ruminants, 543.
 —— new source of, 1229.
 —— percentage of, in wood ashes, 1313.
 —— preparation of aromatic ethereal salts of, 839.
 —— "reduced" and "soluble," comparative value of, in superphosphates, 91.
 —— saturation of, by bases, 692.
 —— soluble, suggestion for a uniform method of estimating, 994.
 —— volumetric estimation of, 94.
 Phosphorite as a manure, 92.
 Phosphorous acid, the anhydride of, 140.
 —— anhydride, 140.
 Phosphorus, conversion of yellow into red, a lecture experiment, 689.
 —— estimation of, in iron, 897.
 —— —— — in iron and steel, 338.
 —— iodides, molecular weights of, 1264.
 —— oxidation of, 1263.
 —— oxyiodide, 140.
 Phosphorus, pentasulphide, 693.
 —— quantivalence of, 8.
 —— trisulphide, sulphur salts derived from, 9.
 Phosphorus-bases, occurrence of, in the urine, &c., in acute phosphorus poisoning, 325.
 Phosphorus-betaïnes, 718.
 Phosphorus-poisoning in hens, 544.
 —— occurrence of phosphorus-bases in the urine, &c., in, acute cases of, 325.
 Phosphotungstates, 469.
 Photography, colour, by tinting layers of coagulated albumin, 668.
 —— decorating mirrors and metallic surfaces by the aid of, 247.
 —— spectrum impressed on silver chloride, and its bearing on silver printing in, 2.
 Photolithography, ink for, 114.
 Photosantonic acid, derivatives of, 627.
 Phototypography, ink for, 114.
 Phrenosin, 537.
 Phthalic acid, carbamic and thiocarbamic derivatives of, 1297.
 —— dinitro-, 63.
 —— monochloro-, and its salts, 734.
 —— nitro-, 63.
 —— some derivatives of, 404.
 —— tetrachloro-, 1210.
 —— acids, nitro-, 404.
 —— anhydride, acids formed by the action of xylene and its homologues on, 848.
 —— ureide, 1298.
 Phthalimide, 1297.
 Phthalin of fluoresceïn chloride, 1097.
 Phthalocarbamic acid, 1298.
 Phthalothiocarbamic acid, 1298.
 Phthalylbenzoanilide, 508.
 Phthalyl-di-phenylamine, 1060.
 Phylloxyanin, oxidation and distillation of, 69, 412.
 Phylloxera question, contributions to, 82, 646, 888.
 Physiological oxidation, 1307.
 Phyosterin from *Ethalium septicum*, 729.
 Picramic acid, action of cyanogen on, 969.
 Picrite-porphyrty of Steierdorf in the Bannat, 587.
 Picropodophyllic acid, 976, 977, 978.
 Picropodophyllin, 976, 977.
 Picrosmine, 473.
 Picrotoxin, composition of, 412.
 Pig-iron, desulphurising, 345.
 Pigs, fattening of, 636.
 Pilarite, a new mineral of the chrysocolla-group, 582.

Pilocarpine, action of acids on, 1115.
 —— action of potash on, 744.
 —— formula of, 75.
 —— and its salts, examination of, 317.
 Pinacone, heat of combustion of, 356, 568.
 Pine-bark, occurrence of ellagic acid in, 82.
Pinus Pumilio, ethereal oil of, 410.
 Pioscope, Heeren's, 559.
 Piperethylalkine iodide, 1194.
 Piperidine, derivatives of, 982.
 —— nitroso-, 983.
 —— —— reduction of, 1115.
 Piperine, artificial, 1217.
Piperpropylalkine, 165.
Piperpropylalkine iodide, 1194.
Piperpropylglycoline, 1194.
 Piperylene, 983.
 Piperylhydrazine, and its hydrochloride, 1115.
 Piperylurethane, 983.
 Pirylene, 983.
Pistacia Lentiscus, essential oil of, 208.
 Plant alkaloids, separation of ptomaines from, 1006.
 Plant cells, influence of certain substances on, 881.
 Plant development, certain bye-products of, 761.
 Plant diseases, researches on, 888.
 Plant forms, electrical researches on, 638.
 Plant parasites, researches on, 888.
 Plants, alteration in, when grown on heated soils, 641.
 —— annual, ripening of, 419.
 —— certain, changes accompanying the ripening of, 80.
 —— containing chlorophyll, aldehyde-like substances in the cells of, 243.
 —— dicotyledonous, separation of calcium carbonate in the wood of, 82.
 —— effect of light on transpiration in, 418.
 —— fixation of atmospheric ammonia by, 242.
 —— formation of starch in, 640.
 —— germinating, formation of xanthine bodies in, 987.
 —— hydantoin in, 243.
 —— influence of space on the growth of, 880.
 —— new instances of phosphorescence in, 422.
 —— nitrogenous constituents of, 645, 885.
 —— occurrence of ammonia in, 885.
 —— origin of saccharine substances in, 881.
 —— peptone-forming ferment in, 880.

Plants, physiological signification of transpiration in, 327.
 —— quantitative estimation of albuminoïds and non-albuminous matter in, 901.
 —— respiration of, 641.
 —— the combination in which nitrogen is most available for, 769.
 —— time at which potash exercises the greatest influence on, 988.
 —— transpiration of, 87, 327, 418.
 —— water distribution in, 327.
 Plaster in wines, estimation of, 425.
 Platinum, incandescent, electrical resistance and coefficient of expansion of, 354.
 —— metastannate, 809.
 —— plating of tin, brass, white metal, or copper utensils with, 1145.
 —— some new compounds of, 299.
 Platinum-black, change of state of, 1023.
 Platinum-printing, photographic, 113.
Poa pratensis, cultivation of, in Saxony, 423.
 Pocket pile with jointed elements, 447.
 Podophylic acid, 977, 978.
 Podophyllin, constituents of, 976.
 Podophylloquercetin, 977, 978.
 Podophyllotoxin, 977.
 Poison of Bothrops, potassium permanaganate as an antidote to, 879.
 Poisoning by hydrocyanic acid, detection of, after a long time, 246.
 Polarisation, dielectrical, existence of, in electrolytes, 789.
 —— of electrodes and conductivity of liquids, 912.
 Pollen, estimation of, in hops, 1331.
 Polybasic acids, etherification of, 383.
 Polychroï nuclei of black mica, 811.
 Popoff's law of the oxidation of ketones, note on, 594.
 Porcelain, examination of Chinese and Japanese rocks used for the manufacture of, 483.
 —— method of printing and burning-in of names, monograms, &c., on, 785.
 Portland cements, 1143.
 Potable water, analysis of, 1325.
 —— —— estimation of organic matter in, 1324.
 —— waters, tests for nitrates in, 556.
 Potash, estimation of, in potassium sulphate, 553.
 —— estimation of, in wine, 336.
 —— from bamboo, 781.
 —— salts as manures for sugar-beets, 1130.
 —— salts, manuring with, 770.

- Potash and soda, separation and estimation of, by the indirect method in plant-ashes, fertilisers, and similar substances, 658.
 Potash-leys, estimation of potassium ferrocyanide in, 895.
 Potassiobismuthous iodide as a test for alkaloids, 900.
 Potassio-mercuric compounds, 806.
 Potassium, atomic weight of, 1231.
 —— bromide, detection of lead in, 99.
 —— carbonate, percentage of, in wood ashes, 1313.
 —— chromate, action of, on ammonium chloride, 1269.
 —— —— alkaline reaction of, 1268.
 —— chromicyanide, 485.
 —— chromocyanide, 485.
 —— dichromate, action of, on potassium iodide, 1268.
 —— —— alkalimetric titration of, and its use in alkalimetry, 1233.
 —— estimation of, as platinochloride, 1231.
 —— —— in potassium salts and in manures, 95.
 —— estimation of, 1132.
 —— ferricyanide, heat of formation of, 790.
 —— ferrocyanide, estimation of, in soda and potash-leys, 895.
 —— formate, action of heat on, 1050.
 —— iodide, action of lead carbonate on, 142.
 —— —— action of lead oxide on, 142.
 —— —— action of lead peroxide on, 143.
 —— —— action of potassium dichromate on, 1268.
 —— —— commercial, analysis of, 96.
 —— permanganate, action of different kinds of benzoic acid and their sodium salts on, 339.
 —— salicylates, neutral and basic, action of phosphorus oxychloride on, 618.
 —— sodium cobalt nitrite as a test for, 95.
 —— sulphate, estimation of, in kainite, 96.
 —— —— estimation of potash in, 553.
 —— tartrate, estimation of, in wine, 1236.
 —— thiocyanate, conversion of perthiocyanic acid into, 1274.
 —— trichloracetate, action of potassium cyanide on, 711.
 —— and ammonium tri- and tetrachromates, 146.
 —— and silver, haloid salts of, thermic phenomena attending the formation of, 1019.
- Potassium-homopyrroline, action of melted potash on, 213.
 Potassium-mica, 473.
 Potassium-pyrroline, action of halogenated organic radicles on, 606.
 —— —— reaction of, with chlorinated compounds and bromine, 213.
 Potato culture, 766.
 Potato-starch, physico-chemical changes produced in, by boiling, 422.
 Potatoes, changes effected by frost on the composition of, 1227.
 —— cultivation of, 83, 550, 990.
 —— —— and the feeding value of various sorts, 550.
 —— experiments on, with potassium sodium nitrate, 771.
 —— internal growth of, 641.
 —— loss of starch occasioned by the sprouting of, 242.
 —— manuring of, 93, 1130.
 —— new use for, 1340.
 —— nitrogenous constituents of, 885.
 —— occurrence of hypoxanthine in, 1125.
 Poudrette, value of, 651.
 Press-yeast, testing of, 113.
 Primitive rocks, presence of titanium and vanadium in all, 371.
 Printing, use of electrolysis in, 1338.
 —— and burning-in of names, monograms, &c., on glass and porcelain, method of, 785.
 Prollius' method for the estimation of alkaloids in cinchona bark, 1139.
 Propane, trichloro-, 589.
 Propenyltricarboxylic acid, 1191.
 Propionamide, monobromo-, 1052.
 Propionic acid, chloro-, 38.
 —— —— chlorotribromo-, and its salts, 1047.
 —— —— *a*-nitroso-, new method of preparing, and the mode of action of hydroxylamine, 1047.
 —— —— tribromo-, and its salts, 1186.
 —— bromide, *a*-bromo-, action of zinc-methyl on, 36.
 Propyl alcohol (normal), specific heat and latent heat of evaporation, 355.
 —— —— trichloro-, 295.
 —— derivatives of ethyl acetoacetate, 599.
 Propyl metacresylate, 1199.
 Propylbutyrylcarbamide, 1053.
 Propylene, preparation of, 1038.
 —— bromide, debromination of, by means of silver oxide, 1038.
 —— chloride, action of hydriodic acid on, 294.
 —— glycol, 377.
 Propylenedipiperidine, 1194.

Propylethenyltricarbonic acid, 948.
Propylglyoxaline, 821.
Propylidene chloride, β -chloro-, 589.
Propyl-metacresol and its derivatives, 1198.
 —— synthesis of, by means of anhydrous magnesium chloride, 838.
Propylpiperidine, 535, 1194.
Propylsuccinic acid, 948.
Prosopile, composition of, 1176.
 Proteid metabolism of the body, influence of sodium and calcium carbonates on, 750.
 —— substances, mechanism of putrid fermentation of, 1115.
Protocatechic aldehyde, preparation of, from catechol, 54.
Protoplasm, chemical distinctions between living and dead, 546.
 —— living, aldehyde nature of, 547, 882.
 —— reducing action of, 882.
Pseudotropaeine, 984.
Pseudochrysolites (bottle-stones) of Moravia and Bohemia, 581.
Pseudocumene, methylation of, 391.
Pseudocumenaphthalic acid, 848.
Pseudo-gaylussite, 582.
Pseudo-indican, 308.
Pseudomorphs, artificial, of göthite, limonite, and haematite, 576.
Pseudomorphs of iron pyrites from Pribram, 575.
Psychosine, 537.
Ptomaines, 246, 635.
 —— and their importance in judicial cases, 1006.
 —— formation of, 741.
 —— separation of, from plant alkaloids, 1006.
 —— substances analogous to, in digested albuminoid matters, 1115.
 —— supposed reagent for distinguishing, from vegetable alkaloids, 430.
Pulvic acid, constitution and ethers of, 1078, 1079.
 —— —— products of reduction of, and their constitution, 1076, 1077.
Pumices, Vesuvian, collected on Monte Sant Angelo, chemical composition of, 814.
Pumpkin seeds, crystallised albumin from, 877.
Purpureochromium salts, bromo-, and iodo-, 468.
Purpurogallin and its derivatives, 839, 970, 1065.
Pus from the human subject, certain constituents of, 759.
Putrefaction, evolution of free nitrogen during, 991, 1122.
 —— products, bases found in, 1307.

Pyrene, amido-, 206.
 —— mono- and di-nitro-, 206.
 —— sulphate and hydrochloride, amido-, 207.
Pyridine, action of bromine on, 1215.
 —— conversion of pyrroline into, 867, 1214.
 —— dibromo-, 316, 983.
 —— monobromo-, 867.
 —— mono- and di-bromo-, 1214.
 —— bases, action of ethylene chlorhydrin on, 1303.
 —— —— derived from brucine, 1302.
 —— bromide, hydrobromide of, 1216.
 —— cyanide and its salts, 627.
Pyridine-betaine and its derivatives, 1109.
 γ -Pyridinecarboxylic acid, and the action of hydrochloric acid on, 311.
Pyridinedicarboxylic acid, a new, 230.
Pyridinesulphonic acid and its salts, 627.
Pyridinetricarboxylic acid, 222.
Pyrites, estimation of sulphur in, 998.
Pyrocinchoninic acid and derivatives of, 1304.
 —— —— and its formation from oil of turpentine, 1114.
 —— anhydride, 1304.
Pyrocinchonimide, 1305.
Pyrocoll, action of phosphorus pentachloride on, 875.
 —— derivatives of, 233, 875.
 —— mono- and di-bromo-, 234.
Pyrogallol, absorption of oxygen by an alkaline solution of, 401.
 —— action of phosphorus oxychloride on, in presence of acetone, 1290.
 —— action of sulphuric acid on, 1289.
 —— attempted synthesis of, 175.
 —— oxidation of, in presence of free acid, 839.
 —— oxidation of, in presence of gum arabic, 970.
 —— mononitro-, 1201.
Pyrogalloquinone, 839.
Pyromecazone and its nitro-compound, 601.
Pyromecazonic acid, 601.
Pyromelic acid, obtained by the electrolysis of an alkaline solution with carbon electrodes, 850.
Pyromucic acid, nitro-, and its ethyl salt, 499.
Pyrophotosantonic acid and its salts, 627.
Pyroracemic acid, action of hydroxylamine on, 1048.
 —— —— action of sodium thiosulphate on, 1051.
Pyrosulphuryl chloride, density of the vapour of, 694.

Pyrosulphuryl chloride, thermal constants of, 463.
 Pyrotartaric acid, etherification of, 383.
 —— dibromo-, 1191.
 —— —— normal (glutaric acid), transformation products of, 1189.
 Pyrotetraetic acid and some of its salts, 41.
 Pyrousnetic acid and its acetyl-derivative, 1081.
 Pyruvic acid and its acetyl-derivative, 1079, 1081.
 Pyroxanthin and its derivatives, 306.
 —— dibromo-, 307.
 —— tetrabromide, dibromo-, 307.
 Pyroxylan compounds, friable, conversion of hydrocellulose into, 381.
 Pyrrolidine, a third homologue of, in Dippel's oil, 529.
 —— action of nascent hydrogen on, 1214.
 —— conversion of, into pyridine, 867, 1214.
 —— series, some compounds of, 212.
 β -Pyrrolinocarboxylic acid, 213.
 Pyruvic acid, 758.

Q.

Quassia and bromo-derivative of, 1302.
 Quartz, mealy, 474.
 —— separation of, from silicates, 894.
 —— smoky, liquid carbonic anhydride in, 474.
 —— —— of Branchville, Connecticut, gaseous substances contained in, 474.
 Quebrachamine, 743.
 Quebrachine and some of its salts, 742, 743.
Quebracho colorado, alkaloids from the bark of, 744.
 Quebracho drugs from the Argentine Republic, 742.
 Quebrachol and its derivatives, 744.
 Quinic acid, etherification of, 487.
 Quinidine and quinine, compound of, 414.
 —— and urea, double salt of, 74.
 Quinine, estimation of, 560.
 —— —— as herapathite, 341.
 —— oxidation of, 220.
 —— separation of cinchonidine from, 74.
 —— some compounds of, 218.
 —— dimethiodide, 218.
 —— hydrochloride, remarkable behaviour of, 1113.
 —— —— and urea, double salt of, 74.

Quinine iodate and bromate, physiological activity of superoxygenated molecules, especially those of, 879.
 —— iodosulphate, formation of, in presence of morphine, 1005.
 —— with cupric acetate, 219.
 —— with silver nitrate, 219.
 —— and quinidine, compound of, 414.
 Quininic acid, action of hydrochloric acid on, 222.
 —— —— and its salts, 220.
 —— —— hydrochloride of, 222.
 —— —— oxidation of, 222.
 Quinizarin, reduction of, 856.
 Quinol, 232.
 —— dibromo-, 398, 400.
 —— derivatives, 52.
 Quinoldisulphonic acid, potassium salt of, 1075.
 Quinoline, a homologue of, 868.
 —— action of bromine on, 1215.
 —— action of ethylene chlorhydrin on, 1303.
 —— action of monochloracetic acid on, 1110.
 —— addition-products of, and mono-haloid paraffin-derivatives, behaviour of, with silver oxide, 980.
 —— addition-products of the bases obtained from, with the alkyl chlorides and iodides, 1112.
 —— amido-, 413.
 —— bromide, hydrobromide of, 1215.
 —— cyanide, 413.
 —— derivatives, 412, 530, 1111.
 —— diiodo-, 1111.
 —— dinitro-, 979.
 —— halogen derivatives of, 978.
 —— methoxide, 980.
 —— monochloro-, 732.
 —— physiological effects and chemical reactions of, 214.
 —— products of the transformation of, 739.
 —— salicylate, 868.
 —— series, synthesis of, 71, 1216.
 —— tartrate, 868.
 —— tetrabromo-, 1110.
 —— trichloro-, 1210.
 Quinolinebenzcarboxylic acid, 413, 981.
 —— acids and their salts, 71, 73.
 Quinolinocarboxylic acids and their salts, 71.
 Quinolinemethiodide, dibromo-, 980.
 Quinolinemethoxide, monobromo-, 980.
 Quinols, chloro-, 612.
 Quinone, chlorine and bromine derivatives of, 509.
 —— tri- and tetra-chloro-, conversion of paramidophenol into, and tri-chloroquinonechlorimide, 611.

Quinonechlorimide, trichloro-, and its derivatives, 400.
 —— tetrahydride, 713.
 —— trichloro-, conversion of paramidophenol into, and tri- and tetrachloroquinone, 611.
 Quinomedianilide, dichloro-, 400.
 Quinonedimethylanilide, trichloro-, 400.
 Quinonediorthethoxyanilide, dichloro-, 400.
 Quinonehydronicarboxylic acid and its salts, 714.
 Quinones, action of acid chlorides and bromides on, 838.
 —— action of amines on, 735, 967.
 —— chlorinated, action of ammonia and ammonia bases on, 510.
 β -Quinophenol and its salts, 227.

R.

Racemic acid, decomposition of, 602.
 Radiant heat, the constituent of the atmosphere which absorbs, 566.
 —— matter from electrodes, 3.
 Rail-steel, analysis of, 336.
 Raimondite, optical properties of, 281.
 Rain, passage of, through the soil, 88.
 —— and heat, distribution of, during the growth of beet, 990.
 Rain-water collected at Rothamsted, 889.
 Rainfall, daily, 1227.
 —— in Germany, the highest daily, 87.
 Ralstonite, composition of, 1176.
 Rangiformic acid, 1083, 1084.
 Rape, perishing of, in winter, 548.
 Razamowskina, occurrence of, near Friedstadt, in Upper Austria, 580.
 Realgar, occurrence of, in Utah, 148.
 Red lead, estimation of, 99.
 Reduction-processes in the animal body, 952.
 Refraction-equivalents of carbon, hydrogen, oxygen, and nitrogen in organic compounds, 133.
 Refractive power, influence of the structure of organic substances on their, 349.
 "Reh," an inflorescence on the soil of certain districts of India, composition of, 650.
 Reimer's creamer, experiments with an improved form of, 124.
 Rennet, preparation of essence of, 1149.
 —— diastase, 437.
 —— ferment, action of, 1149.
 Resacetoin triacetate, 1288.
 Residues, utilisation of, 248.
 —— from gas manufacture, utilisation of, 1181.

Resins, decomposition of, by distillation over zinc-dust, 209.
 Resorcincitrein, 399.
 Resorcinol, action of nitrobenzene on, 785.
 —— dibromo-, 193.
 —— dye-stuffs, 968.
 Resorcinoxalein, and its derivatives, 399.
 —— pentabrom-, 399.
 Resorcintartrein, 399.
 Resocyanin, 509, 1289.
 Retrogradation produced by the electric discharge during the conversion of oxygen into ozone, 688.
 Rhine-wine, bouquet of, 122.
 Rhizome of *Zinziber officinalis*, 626.
 Rhodammonium compounds, 1173.
 Rhodochromium salts, 1168.
 Rhubarb, St. Petersburg, 1126.
 Rocks, action of sulphurous acid on some, 583.
 —— calcareous, of the province of Salerno, chemical researches on, 811.
 —— crystalline, in the neighbourhood of Messina, 1177.
 —— presence of manganese on the surface of, 1270.
 —— thermal conductivity of, 790.
 Roots, amount of non-albuminous nitrogen in, 83.
 Rosanine sulphite, reaction of organic compounds with, 179.
 Rosanilines, conditions of formation of, 1284.
 —— homologous and isomeric, 964.
 Rosin, quantitative separation of, from fats, 663.
 Rosin-oil, 64.
 —— —— caproic acid in, 711.
 Rubidium and its salts, preparation of, 464.
 —— formate, action of heat on, 1050.
 Rum, composition and examination of, 102.

S.

Saccharimetric test by inversion, correction of, 105.
 Saccharin, 820.
 Saccharine substances, origin of, in plants, 881.
Saccharomyces apiculatus, 80.
 Sacchulmic acid, 605.
 —— compounds, action of halogens on, 1181.
 Sacchulmin compounds, 605.
 Sacchulmous acid, 606.

- Sage, garden (*Satureia hortensis*), occurrence of carvacrol in the ethereal oil of, 1065.
- Salicin, action of heat on, 303.
— solubility of, 303.
- Salicylaldehyde-green, 393.
- Salicylglycollic acid, and the anhydride, 515.
- Salicylic acid, action of iodine on the silver salt of, 970.
— aqueous solutions of, 1293.
— as an antiseptic, 1010.
— decomposition of the calcium salt of, by dry distillation, 617.
— estimation of, in butter, milk, and urine, 1003.
— occurrence of, in the *Violaceæ*, 548.
— preservation of wine by means of, 1014.
- Saligenol, derivatives of, 174.
- Saline solutions, thermal constants of the substitution of potassium for other metals in, 1257.
- Salix alba* (white willow), analysis of, 998.
- Saliva, diastatic action of, 319.
— human, composition of, 754.
— presence of ammonia in, 78.
— influence of acids, alkalis, and gastric juice on the diastatic action of, 319.
— influence of peptones on the diastatic action of, 1117.
- Salivary digestion, products of, 320.
- Salt brines of West Virginia, examination of the mother-liquors from, for iodine, 25.
— works, Allendorf - on - Worra, mother-liquors of, 24.
- Saltpetre, analysis of, by the aid of Lunge's nitrometer, 774.
— manuring with, 1229.
— yellow, containing iodine and chromium, 471.
- Salts, heat of solution of some mixtures of, 1257.
— hydration of, 12, 1163.
— of chromium and mercury, 293.
— of the alkalis, and alkaline earths, solubility of mixtures of, 1264.
- Saponification, 123.
- Sapphire, cause of the blue colour of, 1269.
- Sarcosine, decomposition of, in the human body, 78.
- Savory, essence of, 737.
- Scherif's process for preserving milk, 1016.
- Schizomycetic fermentation, 1121.
- Schneeb ergite, a new mineral, 150.
- Scolecite, 582.
- Sea mud, analysis of, 551.
— — manuring with, 770.
- Sea-water, chlorination of, 923.
— — density and chlorination of, taken by the "Travailleur" in 1881, 798.
- Sebacic acid, formation of, by the distillation of crude fatty acids in super-heated steam, 715.
- Secondary alcohols, general method of preparing, 376.
— batteries, Grove's, Planté's, and Faure's, 352.
- Seed sown, influence of the distance between, on the growth and quality of the crops, 646.
- Seed-sowing, thin or thick, 329.
- Seeds during germination, influence of light on the respiration of, 419.
— influence of the weight of, on the yield of the crop, 1127.
— part played by fat during the germination of, 883.
- Selenium, occurrence of, in Japan, 362.
— mineral (zorgite) from the Argentine Republic, 1269.
- Separation, surfaces of, 454.
- Separator, Tesla's, 124.
- Sequoia gigantea*, new hydrocarbon from, 208.
- Sequoiene, 208.
- Serine, 1282.
- Serpentine-rocks of the St. Gothard, of the Bobbiese Apennine, and of Monteferrato, near Prato, 586.
- Serum, variations in the composition of, after blood-letting, 751.
- Sewage, utilisation of, 248.
- Shale and petroleum products, relative proportions of olefines in, 100.
- Sheep, lupine-sickness in, 637.
- Sheep-dung, value and composition of, 1315.
- Silica, crystallisation of, from fused metals, 571.
— detection of, by means of the microscope, 245.
- Silicates, decomposition of, by bismuthic oxide, 552.
— natural, application of, in the manufacture of glass, 1245.
— separation of quartz from, 894.
- Silicodecane, 154.
— bromo-, 154.
- Silicofluorides of the metals, affinity value of, as deduced from the law of smallest volumes, 1024.
- Silicomolybdic acid, 702.
- Silicon, derivatives of, 570.
— estimation of, in iron and steel, 1134.
— carbonitride, 571.

- Silicopropyl compounds, 154.
 Silicotetrapropyl, 154.
 Silicotripropyl acetate, 154.
 —— alcohol, 154.
 Silurian rocks in the Territorio d'Iglesiás, Sardinia, 583.
 Silver, benzoate, action of iodine on, 970.
 —— chloride, influence of the concentration of hydrochloric acid in the solubility of, 695.
 —— —— photochemistry of, 2.
 —— —— solubility of, in water, 427.
 —— —— battery, 258.
 —— —— emetic, 389.
 —— —— extraction of, 346.
 —— haloid salts of, and mixtures of the same, effect of the spectrum on, 565.
 —— hyponitrite, action of ethyl iodide on, 926.
 —— metastannate, 808.
 —— minerals, reduction of, by hydrogen in the wet way, 1246.
 —— nitrate solution, ammoniacal, aldehyde reaction with, 1329.
 —— plumbite, 1134.
 —— quantitative estimation of, in lead ores, 1134.
 —— salicylate, action of iodine on, 970.
 —— solution as a reagent for aldehyde, 1329.
 —— stannate, 808.
 —— and cuprous iodides and their alloys, coefficients of contraction and expansion of, 570.
 —— and potassium, haloid salts of, thermic phenomena attending the formation of, 1019.
 Silvering of glass, 127.
 Skatole, detection of, 559.
 —— formation of, in the intestines of herbivora, 240.
 Slag formed by the deposphorising of iron, use of, as manure, 1229.
 —— phosphorescent, 345.
 Slags, basic, from blast furnaces in the Thomas-Gilchrist process, analysis of, 1151.
 Smee's element and galvanic polarisation, 1155.
 Soap, oleic, 1016.
 —— so-called "flux of," 784.
 —— soft, preparation of, 905.
 Soap-leys, spent, recovering glycerol from, 782.
 Soda, manufacture of, 342.
 —— titrating, 895.
 Soda and potash, separation and estimation of, by the indirect method in plant-ashes, fertilisers, and similar substances, 658.
 Soda-leys, estimation of total sulphur and potassium ferrocyanide in, 895.
 —— —— purification of, with zinc 903.
 Soda works, test-method for, 773, 895.
 Sodalite from Tiahuanaco, 285.
 Soda-mercuric compounds, 806.
 Sodium, comparison of the combining energies of the halogens and of, with different organic residues, 934.
 —— acetate, crystallised, use of, for warmers for railway and other carriages, 114.
 —— alum of Japan, 20.
 —— ammonium trimolybdate, 468.
 —— chlorate, growth of crystals of, in presence of another salt, 574.
 —— chloride, action of, on molten copper of various degrees of dryness, 669.
 —— cyanide, and its hydrates, 483.
 —— formate, action of heat on, 1049.
 —— glyceride, action of carbonic oxide on, 377.
 —— hyposulphite (Schützenberger's hydrosulphite), composition of, 465.
 —— nitrate, decomposition of, by aluminia, 562.
 —— —— exhaustion of soils by, 330.
 —— quantitative estimation of, 1132.
 —— salicylates, neutral and basic, action of phosphorus oxychloride on, 618.
 —— sulphate, conversion of, into hydroxide, 12.
 —— —— decomposition of, by calcium bicarbonate, 562.
 —— sulphochromite, 15.
 Sodium-borneol, 66.
 Sodium-menthol, action of cyanogen on, 1213.
 Soft soap, preparation of, 905.
 Soil, amount of water and formation of clefts, &c., in, 1128, 1129.
 —— department of various phosphates in, 550.
 —— deposited by the water employed for washing sugar-beet, composition of, 1315.
 —— evaporation of water in, 87.
 —— in a close or open condition, physical properties of, 1128.
 —— influence exerted by the physical properties of, on the amount of free carbonic anhydride contained in it, 86.
 —— influence of factory waste-water and gases on, 331.
 —— manuring of, with various phosphates at Nancy, 993.
 —— mode of optically demonstrating the permeability of, for air, 89.

- Soil, passage of rain through, 88.
 — phosphoric acid in, 86.
 Soil-analysis, shortened method of, 245.
 Soils, agronomic estimation of, 991.
 — arable, phosphoric acid in, 767.
 — calcareous, of the south-east of France, use of superphosphates on, 1130.
 — Danish, application of Knop's method to, 244.
 — effects of artificial manures on the physical condition of, 1227.
 — exhaustion of, by sodium nitrate, 330.
 — heated, alteration in plants when grown on, 641.
 — impoverishment of, by removal of straw, 991.
 — rich in humus, absorptive capacity of, 889.
 — volcanic, phosphoric acid in, 650.
 — Westphalia, 767.
 Soja bean, cultivation of, 549.
 — — — use of, as food for milch-cows, 83.
 Solids in solution, determination of the specific refraction of, 351.
 — absorption of gases by, 272.
 — diffusion of, 357, 454.
 — liquefaction and cold produced by the mutual action of, 450.
 — molecular volume of, 275.
 — solubility of, in gases, 271.
 — welding of, induced by pressure, 273.
 Solutions, constitution of, 1018.
 — of neutral compounds in benzene, congelation of, 1260.
 Sophoretin, 976.
 Sophorin, 976.
 Sorghum, analysis of, 898.
 Sorghum-sugar pans,aconitic acid in the scale from, 766.
 Specific gravity of a liquid at its boiling point, method of estimating, 893.
 — — — of permanent gases at high temperatures, estimation of, 1159.
 — — — of wax, ceresin, &c., 1139.
 Specific heat of nitrogen tetroxide, 1019.
 — heats of evaporation of saturated alcohols, 355.
 — — — of gases at high temperatures, 449.
 Specific refraction of solid bodies in solution, determination of, 351.
 Specific volumes of liquids, 1259.
 Spectra, discontinuous phosphorescent, observed in an almost perfect vacuum, 445.
 — of carbon compounds, 130.
 — of certain alkaloids and glucosides, 349.
 Spectra of compounds of carbon with hydrogen and nitrogen, 252.
 — of 100 sun-spots observed at Kensington, reduction of observations of, 250.
 — of related elements, 349.
 — of stars, photographic, 250.
 Spectral colours and pigments, change in colour-tone of, by diminution in intensity of the light, 1153.
 — lines of different elements, identity of, 253.
 Spectroscope, improved slit for, 1229.
 Spectroscopic investigations, 349.
 — — — observations with monochromatic light, 677.
 Spectrum, effect of, on the haloid salts of silver, and mixtures of the same, 565.
 — impressed on silver chloride, and its bearing on silver printing in photography, 2.
 — influence of molecular grouping in organic bodies on their absorption, 130.
 — of acetylene, 129.
 — of carbon, 251.
 — of carbonic anhydride, 253.
 — of hydrogen, 129.
 — of magnesium and lithium, 254.
 — of the flame of hydrogen, 250.
 — of water, 251.
 — observation, new method of, 249.
 Spherulites in eruptive rocks, 705.
 Sphingosine, 537.
 Spirit, crude, valuation of, 1145.
 — detection of fusel oil in, 429.
 — manufacture of, 1247.
 Splenic fever, origin and prevention of, 323, 543.
 — — — bacilla, effect of gases on, 417.
 Stable manure, preservation of, in deep stalls, 333.
 Standard acid, preparation of, 1230.
 — solutions, various, expansion of, by heat, 1230.
 Stanne oxide, dimorphism of, 1030.
 Stannous oxide, action of acid and alkaline solutions on, 1029, 1030.
 — salts, some reactions of, 808.
 — sulphides, action of alkaline sulphides on, 1030.
 Starch, action of diastatic ferments on, 749.
 — alkali-compounds of, 490.
 — analysis of, 339.
 — elementary composition of, 1183.
 — fermentation of, 1311.
 — formation of, in plants, 640.
 — loss of, occasioned by the sprouting of potatoes, 242.

- Starch, potato, physico-chemical changes produced in, by boiling, 422.
 — supposed conversion of, into sugar by water at a high temperature, 30.
 Starch-grains, growth of, by intussusception, 761.
 — — — structure of, 1122.
 Starch-sugar, pure, preparation of, 1274.
 — — — syrup mixed with sugar-house molasses, detection of, 429.
 Stars, photographic spectra of, 250.
 Steam, decomposition of, by red-hot iron or magnesium in a glass tube: a lecture experiment, 690.
 Stearamide, 1274.
 Stearonitril, 1274.
 Steatargillite, 582.
 Steel, analysis of, with special reference to the estimation of carbon and silicon, 1134.
 — cementation of, 116.
 — direct deposition of copper on, 670.
 — effects of compression on, 1145.
 — estimation of chemically combined carbon on, 427.
 — estimation of phosphorus in, 338.
 — influence of sulphur and copper on the working properties of, 1246.
 — method for estimating the carbon in, 337.
 — rail-, analysis of, 336.
 — strength of, at low temperatures, 345.
 Steocarobic acid, 764.
 Stephanite from Pribam, 574.
Steprocaulon vesuvianum, chemical constituents of, 866.
 Stilbenedicarboxylic anhydride and its dinitro-compound, 170.
 — — — Reimer's, 1299.
 Stilbite from the Miage Glacier, Mont Blanc, 290.
 Stomach, absorption in, 748.
 — answer to the question, "Does it digest itself?" 1118.
 — digestion in the, 877.
 Strogenin, 1340.
 Strontia process for the separation of sugar from molasses, 673.
 Strontium chromate, 997.
 — cyanide, 484.
 — saccharate, preparation of, from molasses and syrup, 1015.
 — sulphate, solubility of, in concentrated sulphuric acid, 465.
 Strychnine chloroplatinate, action of potassium thiocyanate on, 299.
 — hydrate, 74.
 Styrene, dibromo-, 730.
 — paramido-, preparation of, from paranitrocinnamic acid, 201.
 Suberonic acid, 716.
 Suberic acid, bromo-derivatives of, 716.
 — — — formation of, by the distillation of crude fatty acids in superheated steam, 715.
 Succindinitranilide, 181.
 Succinic acid, action of nascent hydrogen on, 1185.
 — — — diamido-, 163, 828.
 — — — dibromo-, action of ammonia on, 163.
 — — — — action of thiocarbamide on, 501.
 — — — isodibromo-, debromination of, by means of silver oxide, 1051.
 — — — monochloro-, 828.
 — — — occurrence of, in an encrustation on the bark of "Morus Alba," 602.
 — — — preparation of, from tartaric acid by fermentation, 715.
 — — — anhydride, monochloro-, and monobromo-, 828.
 — — — chloride, reduction of, 497.
 Succinaphthylamide and its nitro-derivatives, 181.
 Succinopropionic acid, 713.
 Succinosuccinic acid, 713.
 Sugar, absorption of, by animal charcoal, 122.
 — action of nitroalizarin on, 785.
 — changes which it undergoes in crystallising, 122.
 — deterioration of, by keeping, 122.
 — estimation of, in "lime mud," 782.
 — estimation of, in wine, 1000.
 — extraction of, from lime sludge, 1015.
 — formation of, in the liver, 540.
 — from molasses, method of obtaining, 122, 673, 784, 1015, 1146.
 — in beet, influence of superphosphates on the percentage of, 1314.
 — inversion of, at the ordinary temperature, 30.
 — inversion of, by carbonic anhydride, 490.
 — investigation of, 782.
 — of oak-bark tannin, 157.
 — physiology of, in the animal system, 322.
 — post-mortem formation of, in the liver, 541.
 — precautions required in using Knapp's solution for estimating, 558.
 — strontia process for the separation of, from molasses, 673.
 Sugar manufacture, improvement in, 122.
 — — — without animal charcoal and with sulphurous anhydride, 905.
 Sulphamides, substituted, 1282.

- Sulphamineparatoluic acid, 186.
 Sulphanilic acid, anhydrous, 195.
 Sulphides, insoluble metallic, action of, on acid solutions of nickel sulphate in presence of hydrogen sulphide, 928.
 Sulphobenzoic acid, so-called, 1096.
 Sulphobenzene, 1058.
 Sulphochromites, 15.
 Sulphocinnamic acids, 1204.
 Sulpho-*a*-dihydroxybenzoic acid and its salts, 193.
 Sulpho-group, displacement of, by bromine, 618.
 Sulphonic acids of hydroxyazobenzene and their derivatives, 1074.
 — derivatives, action of chlorine on, 938.
 Sulphoterephthalic acid, 187.
 Sulphur, action of, on alkaline sulphides in dilute solutions, 141.
 — — — on glass, 696.
 — condition of, in coal, and its relation to coking, 780.
 — detection of, 553.
 — estimation of, 138.
 — — — in coal-gas, 1326.
 — — — in pyrites, 993.
 — — — in soda-leys, 895.
 — in zinc-dust, 670.
 — native, chemical nature of liquid inclosures found in crystals of, 810.
 — — — occurrence of, in the soil of Paris, 470.
 — new method of extracting, 115.
 — oxychloride, a new, 694.
 — oxychlorides, thermal constants of, 463.
 — salts derived from phosphorus trisulphide, 9.
 Sulphuric acid, action of, on zinc and on tin, 693.
 — — — behaviour of nitrogen tetroxide (hyponitric acid) with, 1010.
 — — — estimation of, 894.
 — — — in beer, 556.
 — — — of different degrees of concentration, solidifying points of, 362.
 — — — purification of, by crystallisation, 1163.
 — — — remarks on Lasne and Benker's process for reducing the loss of nitre in the manufacture of, 1010.
 — hydroxychloride, formation of acid chlorides by aid of, 1185.
 — monochloride, behaviour of, with certain elements, 927.
 Sulphurous acid, estimation of, in wine, 773, 994.
 — — — value of, as a disinfectant, 1009.
 Sulphurous anhydride, action of, on nitric oxide in presence or absence of oxygen, 139.
 Sulphurous anhydride, application of, in bleaching, 1337.
 — — — solubility of, in sulphuric acid, 1027.
 — — — amido-, 1282.
 Sulphuryl chloride, preparation of, 10.
 — — — reactions of, 1262.
 — — — thermal constants of, 463.
 Superoxygenated molecules, physiological activity of, especially those of quinine iodate and bromate, 879.
 Superphosphate, manuring with, 1229.
 Superphosphates, analysis of, 141.
 — chemistry of, 141.
 — coarse and fine-grained, 90, 550, 653.
 — comparative value of "reduced" and "soluble" phosphoric acid in, 91.
 — composition of, 1315.
 — influence of, on the percentage of sugar in beet, 1314.
 — use of, on the calcareous soils of the south-east of France, 1130.
 Surfaces of separation, 454.
 Surgical dressings, estimation of phenol in, 106.
 Swedes, action of soluble and insoluble phosphates on, 1228.
 — application of various phosphates as manure for, 91.
 Sylvestrene from *Pinus Pumilio*, 410.
 Synthesis, interpretation of, by Perkin's reaction, 190.
 Syntomid, 75.
 Syntonin, conversion of myosin into, and regeneration from the same, 745.
 Syrup, action of animal charcoal on, 673.
 Syrups, variation in the coefficient of purity of, a consequence of sp. gr., 1146.

T.

- Tachylyte, existence of a mineral analogous to, in a basalt of the environs of Royat (Puy-de-Dôme), 292.
 Tannin, application of, 787.
 — estimation of, in wines, 780.
 — Löwenthal's method of estimating, 1237.
 — oak-bark, sugar of, 157.
 — and oxalic acid, Neubauer's relation between the reducing action of, 1238.
 Tanning, use of algarobilla in, 908.

- Tarapacaite, 471.
Tarchonanthus camphoratus, researches on, 1040.
 Tarconic acid, 869, 871.
 Tarconine, bromo-, action of water and of hydrochloric acid on, 870.
 — — — and some of its salts, 313.
 — — — hydrochloride, action of bromine on, 313, 869.
 Tarconyl alcohol, 1941.
 Tarnine, 870, 872.
 Tartar, estimation of tartaric acid in, 1329.
 Tartaric acid, dry distillation of, 948.
 — — — estimation of, in tartar and in wine lees, 1329.
 — — — estimation of, in wine, 1236.
 — — — free, detection of, in wine, 1000.
 — — — preparation of succinic acid from, by fermentation, 715.
 — — — solubility of the different modifications of, in water, 1191.
 Tartrantimonites, 1051.
 Tartronic acid and its salts, 39.
 — — — crystalline forms of, as given by Pantanelli, 1187.
 — — — from glycerol, 818.
 Telephone, application of, to the estimation of resistance in galvanic circuits and batteries, 789.
 Tellurium, behaviour of, with sulphuric anhydride and with sulphuric acid, 804.
 — — occurrence of, in Japan, 362.
 Temperatures, low, use of liquid ethylene for producing, 914.
 Teraconic acid and its salts, 41, 42, 716.
 Teracrylic acid and its salts, 42, 44.
 Terebangelene, 411.
 Terebenthene, a new, 738.
 — — from *Pinus Pumilio*, 410.
 — — dichloride, action of zinc-dust on, 608.
 Terebic acid, 716.
 — — — chloro-, 717.
 Terebileic acid, 717.
 Terelactone, 42.
 Terpene from oil of coriander, 525.
 — — from the essential oil of the fruit of the *Angelica archangelica*, 497.
 Terpenylic acid, 42, 44.
 — — — products of the dry distillation of, 44.
 Terpin, 411.
 Terpinene, 411.
 Tertiary alcohols, diagnosis of, 1040.
 — — amines: influence of heat on allyl-triethylammonium bromide, 709.
 — — aromatic bases, condensation-products of, 392.
- Tesca's separator, 124.
 Test-methods for soda works, 773.
 Tetanus, influence of, on the acids contained in muscle, 539.
 Tetrabenzoylgallein, 61.
 Tetrabenzylphosphonium chloride, examination of the residues from the preparation of, 725.
 — — — salts, 724.
 Tetracyetyl-gallein, 60.
 Tetracyetyl-purpurogallin, 1066.
 Tetrahedrite, formula of, 147.
 Tetrahydrocinchoninic acid and its derivatives, 530.
 — — — nitroso-, 533.
 Tetrahydroquinoline, 414.
 — — dibromo-, and its salts, 1110.
 Tetra- β -lutidine platinochloride, 310.
 Tetramethylbenzidine and its diamido-compound, 199.
 Tetramethyldiamidotitolyl, 200.
 Tetramethyldiamidototyl, 177, 178.
 Tetramethyldiamidotriphenylcarbinol, paranitro-, 393.
 Tetramethyldiamidotriphenylmethane, paranitro-, 393.
 Tetramethylparaleucaniline, 393.
 Tetramethylpararosaniline, 393.
 Tetramethyltriamidotriphenylmethane, 834.
 Tetraphenylthiocarbamide, 1089.
 — — by Berntsen and Fræse, postscript to the article on, 1299.
 Tetrene-carbimide, 606.
 Tetrene-urethane, 606.
 Tetrethylbenzidine, 200.
 Tetrethylaminodotriphenylcarbinol, oxalate of, 392.
 Tetrethylsulphamide, 1283.
 Tetrethylthiocarbamide, 824.
 Tetrodianil, 178.
 Tetrolditolyl, 178.
 Theobromine, 628, 629.
 — — action of chlorine, and of potassium chlorate and hydrochloric acid on, 633.
 — — conversion of xanthine into, 981.
 Thermic laws relating to the exciting spark in condensers, 447.
 Thermo-chemical data, numerical relations between, 1257.
 Thermometers, mercurial, depression of the zero point in, 913.
Thevetia nereifolia, 308, 328.
 — — — presence of a second poisonous principle in, 1126.
 Thevetin-blue, 309.
 β -Thiobenzoic acid, Fleischer's, 1058.
 Thiocarbamates, 1088.
 — — constitution of, 296.

- Thiocarbamide, derivatives and constitution of, 166, 501.
 — and dithiocarbamic acid, typical connections of, 1090.
 Thiocarbamides, action of alcoholic iodides on, 1088.
 — ethylated, 823.
 — mixed aromatic, products of the decomposition of, by acids, 1212.
 — of phenylhydrazine, 1091.
 Thiocarbanilide, compounds formed by the action of alcoholic iodides on, 723.
 Thiocyanates in the residues from gas manufacture, decomposition of, 1180.
 Thiocyanic acid, action of hydrogen on, 1180.
 — — — and some of its salts, heat of formation of, 1158.
 Thioformanilide, action of heat on, 611, 958.
 Thioformic acid, potassium salt of, 589.
 Thioglycollic acid, action of phenyl- and allyl cyanamide on, 407, 408.
 Thiohydantoins, constitution of, 296.
 — synthesis of, by means of thioglycollic acid, 407.
 Thionyl chloride, thermal constants of, 463.
 Thiosulphate solutions, constancy of, 424.
 Thiovirinuric acid and its salts, 501.
 Thomsenolite, composition of, 1176.
 Thomsonite from Etna, 284.
 Thorite from Hitterö, analysis of, 290.
 Thymol, natural, action of benzyl chloride and zinc on, 171.
 — synthesis of, from cumaldehyde, 727.
 — nitroso-, 728.
 Thymolactic acid, 848.
 α -Thymolsulphonic acid, action of diazo-compounds on, 834.
 Thymoquinone, action of acetic chloride on, 838.
 Thymyl diacetate, monochloro- and monobromo-, 838.
 — dibenzoate, mono- and di-chloro-, 838.
 Tiglic aldehyde, 594.
 "Timothy grass" at different periods of growth, composition of, 1127.
 Tin, a probably dimorphous form of, and some crystals found associated with it, 576.
 — action of sulphuric acid on, 693.
 — crystallised, 576.
 — detection of, in presence of antimony, 777.
 — nitrates, 1266.
 Tin, quick method for the estimation of lead in, 99.
 — and antimony, estimation and separation of, 1324.
 Tincture of iodine, 1010.
 Tissue, consumption of, in starving herbivora, 749.
 Tissue change on a milk diet, 749.
 Tissue substances, method for the easy separation of, 559.
 Tissues, oxidation of, in leukæmia, 1309.
 Titanic acid, oxidation of, 809.
 — — — precipitation of, 1234.
 Titanium, presence of, in all the primitive rocks, 371.
 — minerals, occurrence of, in the Saxon granulites, 580.
 Tobacco, action of alcohol and ether on, and the distillation of the extract thus obtained, 1005.
 — consideration of the active poison in the combustion-products of, 906, 1253.
 — estimation of nicotine in, 108, 1005.
 — smoke, presence of nicotine in, 906, 1253.
 Tobermorite, 289.
 Tolane di-iodide, 521.
 Tolanes, di and tetra-chloro-, 1103.
 Toluene, methylation of, 390.
 — production of benzoic acid and bitter almond oil from, 1146.
 — monobromodiamido-, 392.
 — nitrodi-amido-, 392.
 — para- and ortho-nitro-, action of sodium methylate on, 1062.
 — triamido-, hydrochloride, 392.
 — — — sulphate, 392.
 Toluene red, 964.
 Toluic acid, amido-, transformation of, into chloro- and bromo-metatoluic acids, 607.
 — — — nitro-, 607.
 Toluidine, action of hydrogen dioxide on, 502.
 — nitro-, symmetrical, 1197.
 — mucate, dry distillation of, 178.
 Toluquinolines, three, boiling points and specific gravities of, 1217.
 Toluquinone, a polymeride of, 1065.
 Toluylacrylic acid, 1074.
 Tolylpyrrol, 178.
 Tolyl compounds, diamido-, 177.
 Tolyl methyl ketone, 970.
 Tolyl parathiotoluenesulphonate, measurement of the crystals of, 833.
 Tolylboric acid, 732.
 Tolylenematanitrotoluide, 504.
 p -Tolylethylene thiocarbamate, 1091.
 p -Tolylethyl thiocarbamate, 1091.

- p*-Tolylimidotolylethylene dithiocarbamate, 1091.
 Tolylimidotolylethylenethiocarbamate, para- and ortho-, 1091.
p-Tolylimidotolylethylthiocarbamate, 1091.
 Tolylimidotolylethiocarbamate, ortho- and para-, 1090, 1091.
 Tolymethylthiocarbamate, ortho- and para-, 1090, 1091.
 Tolylorthonitranilide, 504.
p-Tolylphosphine, 963.
 Tolylphosphinic acid, 959.
 Tolylphosphinic acids and their salts, 961.
 Tolylphosphinous acids and their salts, 960.
 Tolylphosphochlorides, 959.
p-Tolylphosphonium iodide, 963.
 Tolylphosphoroxychloride, 959, 960.
 Tolythioethylthiocarbamate, para- and ortho-, 1091.
p-Tolylthiomethylthiocarbamate, 1090.
 Topaz, 473.
 Transpiration in plants, physiological signification of, 327.
 Trees, dicotyledonous, deposit of calcium carbonate in, 887.
 Triacetylcoerulein, 62.
 Tribenzylphosphine, 726.
 — oxide, 725.
 Tribenzylphosphonium oxide, 724.
 Tricresyl phosphate, 839.
 Tricresylmethane, 964.
 Triethyl dinitropyrogallate, 54.
 — meconate, 601.
 — propylethenyltricarbonate, 948.
 — trinitropyrogallate, 54.
 Triethylalkyne iodide, 1194.
 Triethylamine, action of trimethylene bromide on, 501.
 Triethylmethylphosphonium, acid carbonate of, 720.
 — chloride and bromide, 720.
 Triethylphosphine, action of bromacetic acid on, 721.
 — oxide, 720.
 Triethylthiocarbamide, 823.
 Trigenic acid, 168.
 Triisobutylenediamine (a hydramide of the fatty series), 164.
 Trimesitylguanidine, 956.
 Trimethyl carbinol, heat of combustion of, 356, 568.
 Trimethylaminylammonium iodide, 302.
 Trimethylene, 154, 1273.
 — alcohol, preparation of, from glycerol, 156.
 — chloride, bromide, and iodide, 156.
 — oxide, 1278.
 Trimethylpyrroline, 529.
 Trinethylsulphine, action of heat on the salts of, 592.
 Trimethylsulphine iodide, formation of, 1045.
 — salts, 593.
 Tri- β -naphthyl phosphate, 839.
 Trioxypyropylacetolactone, 946.
 Triphane from North Carolina, 151.
 Triphenyl phosphate, 839.
 Triphenylcarbinol, preparation of, 62.
 — diamido, 957.
 Triphenylethane, 1209.
 Triphenylguanidine, action of carbonic chloride on, 182.
 Triphenylmethane, 62.
 — preparation of, 621.
 — diamido, derivatives of, 833.
 — paranitrodiamido-, 833.
 — tetramethyltriamido-, 834.
 Triphenylmethylphosphonium iodide, 1063.
 Triphenylphosphine and its derivatives, 1062.
 — preparation of, 1287.
 — sulphide, 1063.
 — oxide, 1063.
 Triphenylphosphonium hydroxide, 1063.
 Tripolite, 247.
 — compared with gypsum, 116.
 Tritochlorite, 473.
 Tropeine derivatives, 984.
 Tropic acid, 520.
 Tropidine (ethylenehydromethylpyridine), 1206.
 — action of bromine on, 984.
 Tropigenine and its derivatives, 739, 1218.
 Tropilene, 216.
 — oxidation of, 983.
 Tropilidene, 216.
 Tropine, 739, 740.
 — and its derivatives, 216.
 — — — attempted synthesis of, 534.
 — decomposition of, 216, 983, 1206.
 — history of, 415.
 — oxidation of, 740.
 Tuberculosis poison, 637, 1120.
 Tungsten-bronzes, 930.
 Tungstic acid, action of arsenic and phosphoric acids on the sodium salts of, 702.
 — — — colloidal, and its analogy with paratungstic acid, 469.
 — — — constitution of complex mineral acids derived from, 368.
 Tungstoborates, 17.
 Tungstoboric acid, preparation of, 18.
 Turkey-red oil, examination of, 430.
 Turnips, experiments on, with soluble and insoluble phosphates, 91.
 — phosphatic manures on; a report of experiments carried out in Scotland in 1880, 653.
 Tyreeite, 290.

Tyrosine anhydride in milk, 1148.
 —— elimination of nitrogen from, 730.
 —— fusion of, with potash, 514.
 —— rotatory power of, 1206.
 —— synthesis of, 1063.

U.

Ultra-quinine, 317.
 Umbelliferone, derivatives of, 839.
 Umbellulic acid and ethers of, 1186.
 Uranium and its salts, and reduction of the latter, 1269.
 —— properties and atomic weight of, 1031.
 —— tetrabromide, vapour-density of, 143.
 —— tetrachloride, vapour-density of, 143.
 Urea, action of, on animals, 760.
 —— detection of, by oxalic acid, 901.
 —— elimination of, 238.
 —— estimation of, by sodium hypobromite, 778, 1141.
 —— formation of, from ammonia and carbonic anhydride, 721.
 —— formula of, 970.
 —— in the liver, 754.
 —— influence of muscular work on the elimination of sugar and, in diabetes, 755.
 —— Liebig's method of estimating, and its modifications, 779.
 —— physiology and pathology of the elimination of, 542.
 —— quantitative estimation of, by alkaline hypochlorites and hypobromites, 778, 779, 1141.
 —— —— in the blood, 667.
 —— titration of, 780.
 —— and cinchonidine, double salt of, 74.
 —— and quinidine, double salt of, 74.
 —— and quinine hydrochloride, double salt of, 74.
 Ureometer, 246.
 Uric acid, decomposition of, by alkalis, 378.
 —— —— estimation of, 108.
 —— —— excretion of, by birds, 416.
 Urine, acid fermentation of, 755.
 —— bodies in, precipitable by phosphotungstic acid, 755.
 —— examination of, for albumin, 342.
 —— estimation of magnesium in, by titration, 775.
 —— —— phenol in, 106.
 —— —— salicylic acid in, 1003.

Urine, estimation of the nitrogenous constituents of, 1330.
 —— in disease, lactic acid in, 1309.
 —— incompletely oxidised sulphur in, 560.
 —— new method for the quantitative estimation of chlorides in, 551, 552.
 —— occurrence of acetoacetic acid in, 1120.
 —— —— phosphorus-bases in, in acute phosphorus poisoning, 325.
 —— of graminivora, phosphoric acid in, 636.
 —— of ruminants, phosphoric acid in, 543.
 —— old, occurrence of ammonium magnesium phosphate in a sample of, 637.
 —— testing of, for phenol by the pine-wood reaction, 245.
 Urobutylichloralic acid, 76.
 Urochloralic acid, 76, 952, 1116.
 Usneol, 1082.
 Usnetol, 1081.
 β -Usnic acid, 1080.
 Usnic acid and other substances extracted from lichens, researches on, 1079.
 —— anilide, 1082.
 Usnolic acid, 1080, 1082.
Ustilago maidis, analysis of, 785.

V.

Vacuum, electrical resistance of, 353.
 Valeric acid, amido-, normal, and its salts, 599, 709.
 —— —— bromio-, 35.
 —— —— dibromo-, 35.
 Valerolactone, 35, 948.
 —— method of preparation and constitution of, 35.
 —— bromo-, 35.
 Valerylenetrimeethylammonium bromide and its derivatives, 534.
 Vanadate of lead and copper from laurium, 472.
 Vanadinite, 472.
 Vanadium, presence of, in all the primitive rocks, 371.
 —— compounds, preparation of, from the basic slag of Creusot, 1246.
 —— minerals from Cordoba State, Argentine Republic, 150.
 —— trichloride, preparation of, 1268.
 Vanillie acid, nitro-, 1201.
 Vanillin, 55, 1109, 1124.
 —— action of potassium permanganate on, 1329.

- Vapour-densities, estimation of, at the boiling point of selenium, 1159.
 Vapour-tension of mixed liquids, 136.
 Vapours, metallic, reversal of the lines of, 254.
 —— mixed, critical point of, 268.
 Vasculose, 708.
 —— certain properties of, 420.
 Vaseline, German, 786.
 Vegetable extracts, estimation of amides in, 1006.
 —— fat, analysis of, 886.
 —— fats, estimation of free acids in, 429.
 —— skeleton, chemical studies on, 420.
 Vegetation in an atmosphere rich in carbonic anhydride, 639.
 —— influence of factory waste-water and gases on, 331.
 —— influence of the electric light on, 639.
 Ventilation of laboratories, 1332.
 Vesuvian lava of 1631, yellow incrustation from, 470.
 —— pumices collected on Monte Sant' Angelo, chemical composition of, 814.
 Vesuvius, ash ejected from, February 25th, 1882, 932.
 —— new sublimes from the crater of, 370.
 Vetch, wild, analysis of, 883.
 Vibrio, presence of a, in germinating maize, and in the stalk of the plant, 1311.
Vicia villosa, cultivation of, 647.
 Vine, enemies of, 328.
 Vines, manuring, 889, 1129.
 Vinylidethylamine, 1194.
Violaceæ, occurrence of salicylic acid in, 548.
 Violet phosphorescence of calcium sulphide, 677.
 —— syrup, improved mode of preparing, 248.
 Viridine, 502.
 Vitellolutein, 76.
 Vitellorubin, 76.
 Volatile bodies, absorption of, by the aid of heat, 902.
 Volcanic ash ejected from Etna on January 23rd, 1882.
 —— ashes, origin of, 1177.
 —— rocks of Easter Island (Rapa-Nui), 481.
 —— soils, high percentage of phosphoric acid in, 550.
 —— tufa, deposits of, in the province of Salerno, 371.
 Voltaic arc, action of cold on, 259.
 —— —— influence of the temperature of, on barium and calcium sulphates, 362.

- Voltaic cell, 258.
 —— pile, chemical energy of, 1155.
 Volume-constitution of bodies in the solid state, 356.
 —— —— of liquid compounds, 458.
 Vulpic acid and its constitution, 1076, 1078.

W.

- Walkerite, 290.
 Warmers for railway and other carriages, use of crystallised sodium acetate for, 114.
 Waste water, treatment of, 668.
 Water, blue colour of: a lecture experiment, 689.
 —— decomposition of, by the silent discharge in presence of nitrogen, 459.
 —— dissociation of, 453.
 —— distilled, electrolysis of, 1019.
 —— drinking, hygienic significance of, 1142.
 —— drops floating on the surface of, 5.
 —— electrolysis of, 134, 353.
 —— expansion of, by heat, 135.
 —— —— by the absorption of gases, 687.
 —— exposed, evaporation of, 87.
 —— heat of formation of, 135, 682.
 —— in soil, evaporation of, 87.
 —— in which malt had been steeped; composition of, 993.
 —— irrigating, and its action, alteration in the composition of, 655.
 —— lowering of the freezing point of, by pressure, 270.
 —— of the Dead Sea, constitution of, 24.
 —— osmose, manuring with, 993.
 —— rain- and drainage-, collected at Rothamsted, 889.
 —— separation of, within the molecule, 1045.
 —— spectrum of, 251.
 —— synthesis of: a lecture experiment, 138.
 —— and carbonic acid, combination of, 692.
 Water-vapour and carbonic anhydride, temperatures of combustion and dissociation of, 453.
 Water-analysis, 556.
 Water-gas as the fuel of the future, 114.
 Waters, distilled, examination of, 347.
 —— of the Isère and Durance, value of, for agricultural purposes, 92.

- Waters of the Isthmus of Panama, 1178.
 —— of Schinznach, analysis of the deposit from, 589.
 Wax, &c., specific gravity of, 1139.
 Weed-seeds used as fodder, examination of a mixture of, 1226.
 Welding of solid bodies induced by pressure, 273.
 Westphalia soils, 767.
 Wheat, continuous cropping with, 329.
 —— continuous growth of, at Woburn in 1881, 1226.
 —— perishing of, in winter, 548.
 —— plant-ash, analysis of, 548.
 Wilde's chloride of silver gelatin plates for diapositives, 1142.
 Williams's nitrogen process, 100.
 Willow, white (*Salix alba*), analysis of, 988.
 Wine, alkaline earths in, 121.
 —— amount of sulphurous acid necessary to prevent the formation of "mother" in, 1336.
 —— analysis of, 81, 557, 999, 1000, 1137.
 —— and other liquids, detection of sulphurous acid in, 994.
 —— beet-root, 1336.
 —— coloured, possibility of magenta disappearing from, 347.
 —— detection of magenta, archil, and persio in, 1006.
 —— detection of sulphurous acid in, 1231.
 —— effect of gypsum on the constitution of, 434.
 —— estimation of alum and gypsum in, 96.
 —— —— astringent substances in, 1327.
 —— —— œnolin and œnotannin in, 430, 780, 1137.
 —— —— potash in, 336.
 —— —— sulphurous acid in, 773.
 —— —— solid matter in, 557.
 —— —— tartaric acid and potassium tartrate in, 1236.
 —— from Jacquez grapes, analysis of, 1145.
 —— improvements in the manufacture of, 905.
 —— influence of "marc" on, 1014.
 —— made from unripe grapes, 1235.
 —— plastering of, 96, 425, 661, 1248, 1336.
 —— presence of a glycol in, 1249.
 —— preservation of, by means of salicylic acid, 1014.
 —— Rhine, bouquet of, 122.
 —— unfermented and other, analyses of, 81.
- Wine, white, from Erfurt, analysis of, 121.
 Wine-analysis, 1235.
 Wine-casks, treatment of, 434.
 Wine-lees, estimation of tartaric acid in, 1329.
 Wines from marc, composition of, 1335.
 —— pure and sugared, optical properties of, 999.
 —— red, artificially coloured, 1138.
 —— —— percentage of sulphuric acid in, 1320.
 —— sweet, estimation of glycerol in, 1235.
 —— testing of, 557.
 Witherite, artificial production of, 1270.
 Wood, preservation of, by means of copper sulphate, 431.
 Wood-ashes, percentage of potassium carbonate and phosphoric acid in, 1313.
 Wood-tar, constituents of, 50.
 Woody substance and lignified tissues, 1122.
 Wool, experiments with so-called "dissolved wool," 1228.
 Wort, reducing power of, 1137.
 Wrought-iron, direct deposition of copper on, 670.
 —— estimation of chemically combined carbon in, 427.
 Wulfenite from Ruby Hill, Eureka Co., Nevada, analysis of, 20.
 Wurtzite, artificial, 281.

X.

- Xanthine, conversion of, into theobromine and caffeine, 981.
 —— bodies, formation of, in germinating plants, 987.
 Xantholite, 288.
 Xanthoquininic acid and its salts, 223.
 —— —— decomposition of, by heat, 223.
 Xeronic acid, Fittig's, 1114.
 Xylene and its homologues, acids formed by the action of, on phthalic anhydride, 848.
 —— nitro-, symmetrical, oxidation of, 954.
 Xylenephthalic acids, 848.
 Xylene-sulphonamides, benzoyl-derivative of, 1208.
 Xylenes, three isomeric, derivatives of, 1283.
 Xylic acid, third, and its corresponding xylenic acid and salts, 187.
 Xylenic acid, corresponding to the third xylic acid, 187.

Xylidine, action of hydrogen peroxide on, 502.
 Xylidine-ponceau, 1250.
 Xylitone, 942.
 Xylophylin, 1123.
 Xyloquinol, 612.
 —— dibromo-, 612.
 —— chloro-, 612.
 Xyloquinone, 612.
 —— chloro-, 612.
 Xyliphosphinic acid, 964.
 Xyliphosphinous acid, 964.
 Xyliphospho-compounds, 963.
 Xyliphosphodichloride, 963.

Y.

Yeast, development of, in solutions containing a varying quantity of nitrogen, 761.
 —— influence of acids on the formation and activity of, 417.
 —— preservation of, 1146.
 —— pressed, preparation of, 1249.
 —— testing of, 113.
 Yeasts, Munich, various, analysis of, 1146.
 Yolk of egg, 1339.
 Yolk pigments, 76.

Z.

Zero point, depression of, in mercurial thermometers, 913.

Zinc, action of sulphuric acid on, 693.
 —— boiling point of, 697, 1028.
 —— chlorides, ammoniacal, and their heats of formation, 1165:
 —— crude, analyses of, 776.
 —— cyanide, 484.
 —— equivalent of, 697.
 —— estimation of, 98.
 —— estimation of, in its ores, 338.
 —— influence of heat on the molecular structure of, 792.
 —— metallic, analysis of, 553.
 —— —— extraction of, from its solution by aid of the electric current, 481.
 —— separation of cadmium from, 97.
 —— salt formed in Leclanche's battery, 697.
 —— sulphate, removal of iron from, 1265.
 —— —— solution, action of hydrogen sulphide on, 805.
 —— sulphide, crystallisation of, 363.
 —— volumetric estimation of, by titration with potassium ferrocyanide, 775.
 Zinc-carbon couple, electromotive force of, and reply to Berthelot's note on, 1156.
 Zinc-dust, sulphur in, 670.
 Zinc-spinell, fayalite slags containing it, 476.
 Zircon from the granite-veins of Elba, 480.
 —— Tuscan, from Figline (Prato), 479.
 Zorgite, a selenium mineral from the Argentine Republic, 1269.